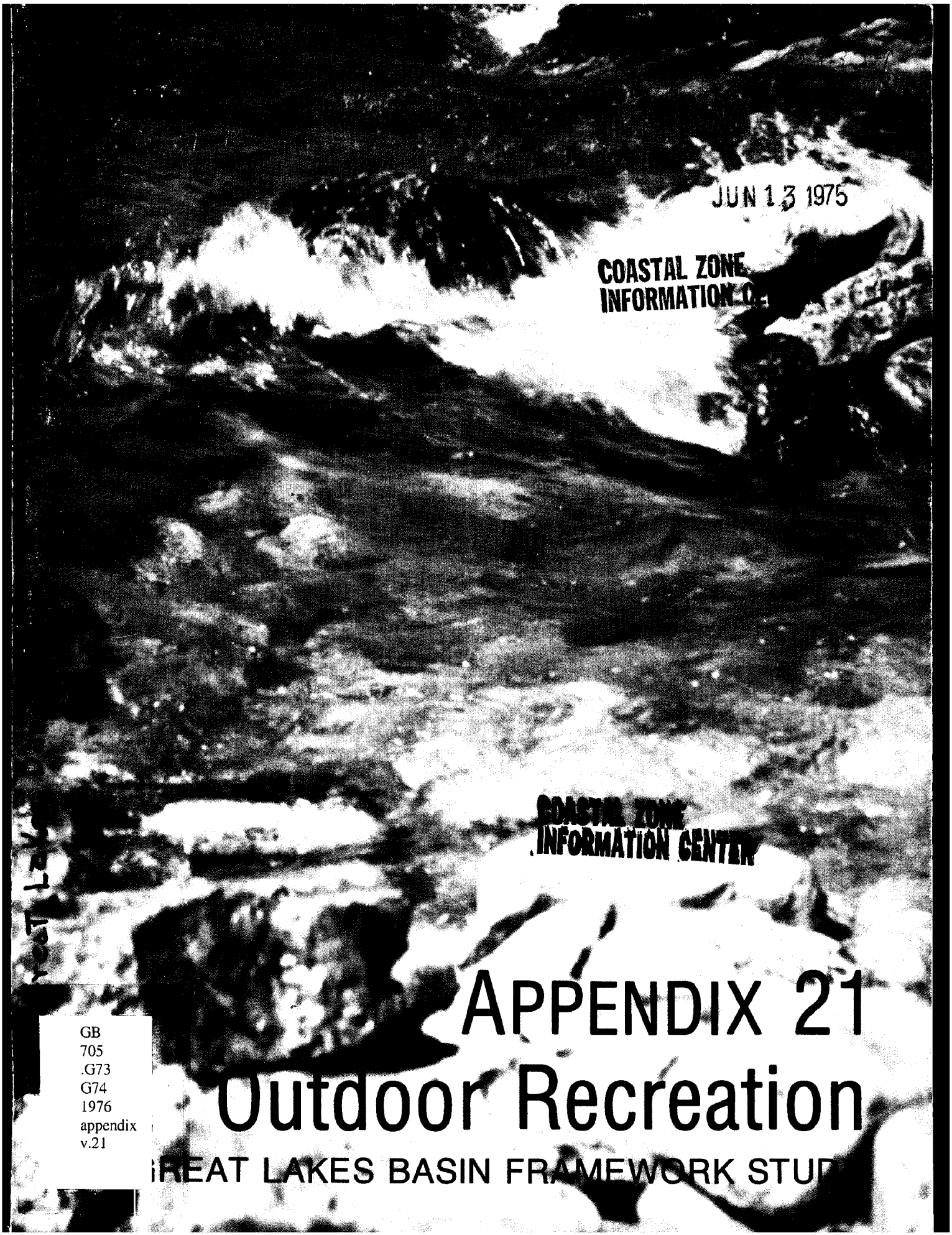

APPENDIX 21

Outdoor Recreation

GREAT LAKES BASIN FRAMEWORK STUD

Great Lakes Basin Framework Study

APPENDIX 21

OUTDOOR RECREATION

GREAT LAKES BASIN COMMISSION

Prepared by Outdoor Recreation Work Group

Sponsored by Bureau of Outdoor Recreation

U.S. Department of the Interior

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Cover photo by Kristine Moore Meves.

This appendix to the *Report* of the *Great Lakes Basin Framework Study* was prepared at field level under the auspices of the Great Lakes Basin Commission to provide data for use in the conduct of the Study and preparation of the *Report*. The conclusions and recommendations herein are those of the group preparing the appendix and not necessarily those of the Basin Commission. The recommendations of the Great Lakes Basin Commission are included in the *Report*.

OUTLINE

SYNOPSIS

Appendix 21, *Outdoor Recreation*, is part of a comprehensive planning study for the conservation, development, utilization, management, and enhancement of the water and related land resources of the Great Lakes Basin. It is a single-purpose framework plan to improve the quantity and quality of outdoor recreation opportunities within the Great Lakes Basin.

To meet foreseeable short- and long-term needs, consideration is given to the timely development and management of these resources as essential aids to the economic development and growth of the region: the preservation of resources to insure that they will be available for future use, and the well-being of all the people as the overriding determinant in such planning.

The requirements for 21 outdoor recreation activities within the Great Lakes Region were determined to be approximately 637 million recreation days in 1970; 861 million in 1980; 1,298 million in 2000; and 1,863 million in 2020.

Five of the 21 recreation activities—sightseeing, pleasure driving, pleasure walking, attending outdoor sports events, and attending outdoor concerts—do not require acquisition of public lands. Therefore, these activities were neither included in the inventory of supply nor in the estimation of total recreational needs. It was also assumed that only 25 percent of all bicycling and horseback riding takes place on public lands. The total requirements for these two activities were, therefore, reduced by 75 percent prior to computing the recreation need.

The Great Lakes, inland lakes, park lands, beaches, forests, streams, trails, scenic highways, recreational harbors, and access sites within the Great Lakes Region provided 208 million recreation days in 1970. Scheduled development will increase the supply to almost 216 million by 1980.

The total recreation needs of the Great Lakes Region were 113.8 million recreation days in 1970. The needs will increase to 219.1 million recreation days in 1980, to 454.7 million in 2000, and to 784.6 million in 2020.

General data on the Great Lakes Region do not provide an accurate picture of the distribution of recreation supply and needs among the Basin's planning subareas. Planning Subareas 1.1 and 1.2, Lake Superior West and Lake Superior East, have 49.6 percent of all land and water acres available for recreation within the entire Region. At the same time, these planning subareas have only 2.3 percent of the total Region requirements. On the other hand, Planning Subareas 2.2, 4.1, and 4.3, containing Chicago, Detroit, and Cleveland, respectively, have 49.2 percent of all the Region's total requirements, but only 3.8 percent of available recreation acres.

The distribution of water surface available for recreation shows a similar disparity between location of resources and needs of the people. The Region's five northern Planning Subareas, 1.1, 1.2, 2.1, 2.4, and 3.1, contain 71 percent of all inland water surface and 68 percent of all water available for recreation, but have only about 13 percent of all the water-surface oriented recreational requirements. At the same time, Planning Subarea 2.2, 4.1, 4.2, and 4.3, containing Chicago, Detroit, Toledo, and Cleveland, respectively, have approximately 56 percent of the Region's water-surface oriented recreational requirements, but only 8.8 percent of its inland water surface and 13.0 percent of its total water surface.

Satisfaction of recreation needs hinges upon effective Federal, State, and local legislation and programs. Through acquisition, development, management, technical aid, and financial assistance programs, the various levels of government possess the means of substantially increasing the recreational supply base. At the Federal level, the Departments of Agriculture, Commerce, Housing and Urban Development, Interior, Labor, and Transportation, and the Environmental Protection Agency, the Office of Economic Opportunity, Property Management and Disposal Services, the Small Business Administration, and the Federal Power Commission all have outdoor recreation responsibilities prescribed by law. Key Federal legislation includes the Land and Water Conservation Fund Act of 1965, Title IX

of the Housing and Urban Development Act of 1965, the Watershed Protection and Flood Prevention Act of 1954, the Water Quality Act of 1965, the Dingell-Johnson Program, the Pittman-Robertson Program, the National Wild and Scenic Rivers Act of 1968, the National Trails System Act of 1968, and many others.

In addition to institutional arrangements, a plan to meet recreation needs must realistically consider the resource base of the Great Lakes Region, the inherent problems of acquisition and development of recreation lands, and the possible solutions to alleviate these problems.

Most of the recreational resources of the Great Lakes Region, such as inland lakes, estuaries and marshes, beach areas, streams, forests, islands, parks, fish and wildlife areas, and scenic, historic, and special ecological areas, are located in its northern portion. However, some potential does exist in the southern portion of the Region, notably the Great Lakes shoreline and the flood plains of rivers.

Recreation problems include competing land uses, high land costs, complex ownership patterns, public opposition and legal restraints attached to reservoirs and associated recreation facilities, inadequate funds and competition for the tax dollar, highway congestion and overuse of certain parks, environmental disturbances by off-the-highway vehicles, physical and legal barriers that deny access to existing and potential recreation lands, multiple-activity incompatibility, inadequate area supervision, inadequate stress on environmental education, and inadequate government-citizen involvement in the planning and decision-making processes.

An outdoor recreation experience is adversely influenced by natural and man-made contaminants dumped on the land, into the water, and into the air. A number of Great Lakes beaches have been periodically closed since 1961 because of polluted waters. Adversely affecting the recreational use of resources in the Region are soil erosion and sedimentation, disposal of dredge spoils, thermal pollution, shoreland development, solid waste disposal, shoreland erosion, and air pollution.

To retain or increase the amount of land and facilities available for recreation, alternative solutions to the above problems include fee acquisition, easements, leasing agreements, more intensive development of existing recreation lands, changes in an area's zoning structure, utilizing existing recreational buffer areas, developing environmental corridors, more effective recreational use of inner-city buildings and land, encouraging recreational participation during non-peak use periods, encouraging the private sector to develop quality recreational facilities, increasing financial assistance, and subsidizing rail and highway transportation for inner-city residents. Other alternatives include administratively controlling access in some areas; preservation of existing and potential scenic, historic, and special ecological areas; transferring recreation requirements from heavily-used to lightly-used areas; eliminating physical and legal barriers that deny recreation access; restricting users in time, space, and numbers; allocating monies and personnel for area supervision and activity programming; developing an environmental education program; and improving communication between government and the public.

Alternatives that would improve the quality of land, water, and air resources include building and construction ordinances for controlling soil erosion and sedimentation, implementation of a dredge spoil disposal system with a minimum adverse impact on the environment, greater care in siting and designing future thermo-nuclear electric generating plants, implementation of shoreland protection and management legislation, improvement of solid waste disposal methods and sites, enforcement of ordinances to prohibit the dumping of wastes into harbors and lakes from recreation watercraft, control of lake levels, and implementation of stronger air pollution legislation.

In addition to the generalities outlined above, the plan discusses the needs, goals, problems, potential programs, and planning priorities that are unique to each of the 15 planning subareas.

The 1970 level of recreational facility development was capable of satisfying 64 percent of the total 1970 requirements for the six water-oriented recreational activities—beach swimming, camping, picnicking, hiking, nature study, and sightseeing. Levels of development proposed are expected to satisfy 80 percent of the projected requirements in 1980 and 2000, and 74 percent of the projected requirements in 2020. An analysis of each planning subarea indicates substantial residual needs in the heavily populated areas. A sizeable amount of residual needs are available for the private sector to satisfy.

Estimated facility expenditures for the six

water-oriented recreational activities amount to $368 million for the 1970–1980 time period, $511 million for the 1980–2000 time period, and $445 million for the 2000–2020 time period. Estimated land costs amount to $454 million for 404,000 acres in the 1970–1980 time period, $498 million for 260,000 acres in the 1980–2000 time period, and $387 million for 238,000 acres in the 2000–2020 time period. For the purpose of this study, it was assumed that the Federal government will contribute 35 percent ($936 million) of the total $2,673 million in land and facility costs between 1970 and 2020. The remaining 65 percent ($1,737 million) would be contributed by non-Federal interests.

FOREWORD

The responsibility for preparation of Appendix 21 was assigned to the Lake Central Region of the Bureau of Outdoor Recreation by the Great Lakes Basin Commission. The appendix is a joint cooperative effort of representatives of the various State and Federal agencies who served as members of the Recreation Work Group.

Special acknowledgment is extended to the members of the Recreation Work Group and to other persons who contributed to this appendix. Their contributions and review guidance were invaluable aids to the formulation of this appendix. They included the National Park Service, U.S. Fish and Wildlife Service, Bureau of Mines, U.S. Geological Survey, Bureau of Outdoor Recreation, and the Field Representative of the U.S. Department of the Interior; the Soil Conservation Service, Forest Service, and Economic Research Service of the U.S. Department of Agriculture; the Corps of Engineers of the U.S. Department of the Army; the Environmental Protection Agency; the Federal Power Commission; the U.S. Coast Guard; the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin; and representatives of various educational and corporate institutions.

The appendix was prepared under the supervision of Francis J. Baker, Chairman of the work group. Other members of the work group included Ralph Fisher, State of Illinois; William Barnes and William Walters, State of Indiana; William Colburn and Wayne H. Verspoor, State of Michigan; Jerry H. Kuehn and Joseph Sizer, State of Minnesota; Jack Fink, Ivan Vamos, Barton Zek, and Charles C. Morrison, State of New York; Norville Hall, State of Ohio; Conrad R. Lickel, State of Pennsylvania; Richard Lindberg, State of Wisconsin; Charles M. Smith and Richard L. Kerr, U.S. Department of Agriculture; Edward Carl Brown, U.S. Department of the Army; Sumner A. Dole and Bruce Miller, U.S. Department of the Interior; Joseph F. Harrison, U.S. Department of Health, Education, and Welfare; Leonard Crook and O. C. Reedy, Great Lakes Basin Commission; Robert L. Bowden, Ohio Northern University; Robert B. Ditton, University of Wisconsin at Green Bay; William Dessecker and Kenneth Wable, Mt. Union College, Ohio; T. F. Ellis, Kaiser Jeep Corp., Toledo; David C. LaValle, Ottawa Regional Planning Commission, Ohio; Glen Haskins, Kent State University, Ohio; Robert D. Henningam, State University Water Resources Center, New York; William McGraw, Michigan Tourist Council; Donald Stolberg, University of Toledo, Ohio; Howard Washka, Lorain County Community College, Ohio; and Arthur Youngblood, Akron Water Department, Ohio.

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INTRODUCTION

General

This appendix surveys the United States portion of the Great Lakes Region, which incorporates 179,000 square miles of water and land in Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, and New York. It finds that the areas carved by continental glaciation thousands of years ago, the 2,000-mile latitudinal extent of Lakes Superior, Michigan, Huron, Erie, and Ontario, encompass a diversity of significant recreational resources, including wave-cut cliffs, gently rolling hills, flat lake plains, sand dunes, inland lakes and marshes, low-gradient streams, forests of hardwoods and conifers, and 4,800 miles of Great Lakes and island shoreline. The appendix indicates the relationships between recreation and the diversity of fish, birds, and mammals.

Influencing recreation within the Basin is the warm summer, cold winter climate that produces 26 to 46 inches of precipitation annually; 55°F to 73°F summer water temperatures on the Great Lakes; a land-use pattern dominated by forest, cropland, and pasture land; and land that is 80 percent privately owned. More than 29 million people live in the Region, 80 percent of them along the southern shores of Lakes Michigan and Erie. With manufacturing and various services associated with urbanization employing the largest number of workers, the average work week is less than 39 hours and the per capita income is about $3,350.

The Great Lakes Basin study area is bounded on the north by Canada, and lies adjacent to four other water resource regions: the North Atlantic Basin on the east, the Ohio River and Upper Mississippi River Basins on the south, and the Souris-Red-Rainy River Basins on the west (Figure 21–1).

FIGURE 21–1 Major Water Resource Basins of the United States

Recreational History of the Region

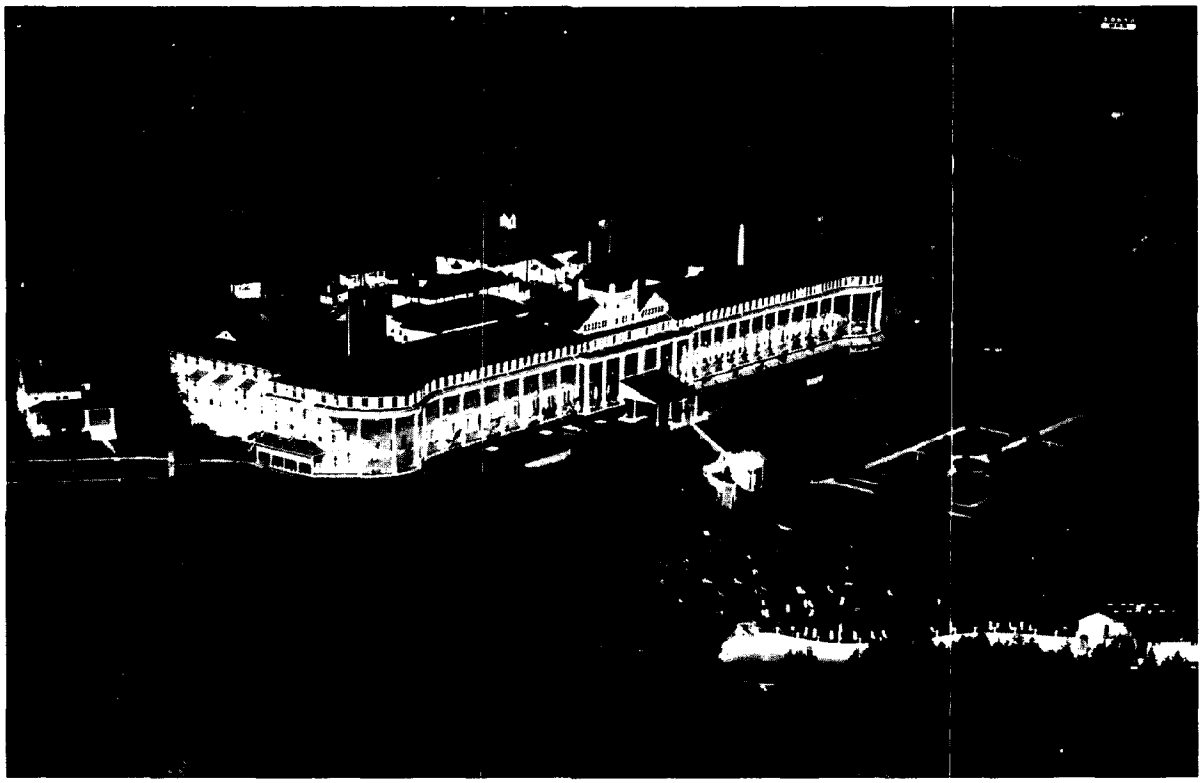
Recreational use of the Great Lakes Region did not really begin until after the Civil War. At that time, development was limited to a few exclusive hotels and large estates accessible only by rail, stage, or boat. To accommodate the demand for transportation to these facilities, a thriving pleasure boat trade soon developed. One of the earliest companies was the Detroit and Cleveland Navigation Company, which operated throughout the Lakes from 1869 to 1951. The Grand Hotel on Mackinac Island, built in the 1880s, is a remaining symbol of this era (Figure 21–2).

By the turn of the century, many communities were established along the Great Lakes shoreline. With the improved modes of travel, they began to spread inland throughout the region. By 1916 the automobile came into popular use. However, recreational travel did not become common in the Great Lakes Region until 1930 when Depression road building programs opened inaccessible areas to mass use. Thus began the "Age of Travel" which has brought unprecedented pressure on the public recreational resources of the Great Lakes.

To meet this growing pressure, long-range planning and development has received increased attention. Much public land and water area within the Region has been developed for outdoor recreation. Developments include Federal, State, county, and local parks and forests; campgrounds; recreational arboretums and gardens, wildlife refuges and game areas; and wilderness areas. There are also extensive privately developed recreational facilities throughout the Region.

Purpose

The purpose of this appendix is to improve the quantity and quality of outdoor recreation available to residents of the Region and adjacent areas by preparing a single-purpose framework plan for recreational developments; promoting single-purpose and multipurpose developments for recreation; giving



Courtesy of Michigan Tourist Council

FIGURE 21–2 Grand Hotel on Mackinac Island. It was built in the 1880s and is a remaining symbol of an era when a few exclusive hotels and large estates were accessible only by rail, stage, or boat.

balance, from the recreational standpoint, to plans of other agencies while maintaining aesthetic quality and well-being of people; and integrating recreation needs with other needs for water and land resources to optimize their use.

This appendix provides a point of reference for resolving differences with competing water and land uses for the logical, coordinated development of water resources in the Region by presenting an inventory of existing and potential recreation resources; determining use pressures on existing facilities and immediate requirements for additional developments; establishing long-range needs and goals for providing adequate recreational opportunities; and recommending a plan of action which will provide a framework for the development and improvement of the Region's recreation resource base.

Present and future requirements for recreation were computed by using existing and projected population as primary determinants. The Region's population and the population of portions of the Office of Business Economics (OBE) economic areas whose population centroids lie within 250 miles of the Region were considered in computing recreation requirements. Present and future tourist use was also evaluated in terms of its impact on the recreation resources of the Region.

Comparing supply and recreation requirements for the target years 1970, 1980, 2000, and 2020 provides an indication of needs from which additional acreage requirements are determined. In addition to the quantity of resource needs, the quality and the locational aspects of present and future needs are discussed.

Scope of Study

Pertinent data for the Great Lakes Region are available from several studies that have been made or are under way. Among these are the *Souris-Red-Rainy River Basins Comprehensive Study*, the *Upper Mississippi River Comprehensive Basin Study*, and the *Middle Atlantic Comprehensive Study*. Other studies are the comprehensive (Type II) studies ongoing in the Grand River basin in Michigan, completed in the Genesee River basin in New York, and the project study ongoing in Southeastern Michigan. Numerous comprehensive studies pertaining to water and land resource development have been or will soon be completed by all eight of the Basin States.

The Corps of Engineers has completed several Basinwide studies for such purposes as commercial navigation, recreational navigation, and levels and flows on the Great Lakes and their connecting channels, and has examined the more critical lakeshore erosion problem areas. Since 1925, the Corps has conducted 416 studies of specific water resource problems within the Region. These studies have resulted in the development of considerable useful data.

The Water Quality Office of the Environmental Protection Agency is developing a comprehensive program for water pollution control for each of the Great Lakes. Various aspects of the program will be based on information supplied by the water-oriented outdoor recreation studies of the five Great Lakes and adjacent lands. The studies were completed over a five-year period (1965–1970) by the Bureau of Outdoor Recreation.

The Federal Power Commission has issued guidelines on the planning and management of recreational facilities at licensed hydroelectric projects. In December 1970, the Federal Power Commission compiled a booklet entitled "Recreation Facility Costs and Design Use" that has been widely distributed to various interested governmental agencies. Also, biennial reports published in June 1969 and midyear 1971 entitled "Recreation Opportunities at Hydroelectric Projects Licensed by the Federal Power Commission" contain an inventory of existing and potential public recreational resources at licensed hydroelectric projects.

In addition to the foregoing comprehensive studies dealing specifically with water resource development, numerous Federal, State, local, and private reports or studies have been of value. Among these are the State Comprehensive Outdoor Recreation Plans updated periodically by each State, and the studies on Great Lakes Shoreline Management carried out by Michigan, Minnesota, and Wisconsin.

The area covered in this appendix partially overlaps several covered by previous comprehensive studies. The northern halves of Minnesota's St. Louis and Lake Counties, included in this study, were included in the *Souris-Red-Rainy River Basins Comprehensive Study*. Kenosha, Walworth, Waukesha, and Racine Counties in Wisconsin; Lake, McHenry, Kane, DuPage, Cook, and Will Counties in Illinois; and Lake, Porter, LaPorte, Marshall, and Starke Counties in Indiana, were included in the *Upper Mississippi*

River Comprehensive Basin Study. St. Lawrence, Oneida, and Herkimer Counties of New York were covered in the *Middle Atlantic Study.*

The population in each of these overlapping areas seeks recreation in Great Lakes Basin areas radiating outward from the population centers. But the amount and type could not be accurately determined because origin and destination of recreationists are not available. Thus both areas used the same population in the calculation of recreation requirements for the respective basin studies, which resulted in some overstatement of requirements for the specific areas. On the other hand, the supply of recreational facilities in these overlapping areas was also counted twice and subtracted from the requirements in the calculation of needs. At this time, it seems likely that the additional requirements produced by the double count of population in the overlapping areas have been largely offset by the double count of existing supply. However, since the developments proposed will fall far short of the projected requirements, the proposed developments are expected to be fully supported by real demands.

Section 1

GENERAL DESCRIPTION

1.1 Physical Characteristics of the Great Lakes Region

1.1.1 Location and Drainage Area

The Great Lakes Basin is defined in this study as the United States portion of the drainage areas of Lake Superior, Lake Michigan, Lake Huron, Lake Erie, Lake Ontario, and those streams entering the St. Lawrence River within the United States. For planning purposes, the Great Lakes Region study area boundaries, shown in Figure 21-3, were drawn along county lines which approximate drainage divides. Located between 41 and 50 degrees north latitude and 76 and 92 degrees west longitude, the Region encompasses practically all of Michigan and parts of Minnesota, Wisconsin, Illinois, Indiana, Ohio, Pennsylvania, and New York. Of the total 299,000 square miles in the entire Great Lakes Basin, about 179,000 square miles (60 percent) are in the United States, including 118,000 square miles of land and 61,000 square miles of water surface. The International Boundary is the northern limit of the Great Lakes Basin study area. It extends approximately 2,000 miles through four of the five Great Lakes and their connecting channels. Only Lake Michigan lies entirely within the United States.

Connecting the Great Lakes are: St. Marys River, linking Lakes Superior and Huron; Straits of Mackinac, linking Lakes Michigan and Huron; St. Clair River, linking Lakes Huron and St. Clair; Detroit River, linking Lakes St. Clair and Erie; Niagara River, linking Lakes Erie and Ontario; and St. Lawrence River, linking Lake Ontario and the Atlantic Ocean. Figure 21-5 gives the longitudinal profile of the Great Lakes. The low water datum of each of the Lakes is given as the lake elevation.

Streams of the Great Lakes Basin are generally small and short. Drainage areas range from about 6,600 square miles for the Maumee River, Ohio, 6,300 square miles for the Saginaw River, Michigan, and 5,600 square miles for the Grand River, Michigan, to areas of a few square miles.

1.1.2 Geology

The present-day outlets and current lake levels of the five Great Lakes probably developed less than 5,000 years ago. Stream and shoreline erosion, considered the primary geomorphic agents since the recession of the continental glaciers, have made only slight changes in the landscape.

Prior to the Pleistocene or Ice Age, the Great Lakes were nonexistent. The area was traversed by well-drained valleys and divides of several large rivers. When the continental ice cap developed a thickness of several thousand feet, it spread southward and completely covered what is now the Great Lakes-St. Lawrence Basin. As the ice sheet slowly melted and retreated northward, tremendous amounts of bedrock debris entrained in the ice mass were released. Parts of the major preglacial valleys were deepened by glacial scouring, while other parts were filled with glacial deposits (Figure 21-4). The area's topography was extensively changed, and the basins of the five Great Lakes were created (Figure 21-5).

An array of hills, valleys, and open space ideal for recreational development resulted from the glaciation, including the glacial grooves on Kelleys Island in Lake Erie, the varied topographic features of the Ice Age National Scientific Reserve in Wisconsin, the numerous glacial lakes in New York, Michigan, Wisconsin, and Minnesota, and the many scenic stream valleys in the Region. A very important aspect of glaciation was the temporary occurrence of large glacial lakes. During the ice front's final northward recession, there was ponding of melt waters between the ice and the drainage basin divides, resulting in a gradually enlarging body of lake waters. In some instances, lake surfaces were hundreds of feet above present lake levels. The effects of these glacial lakes on present

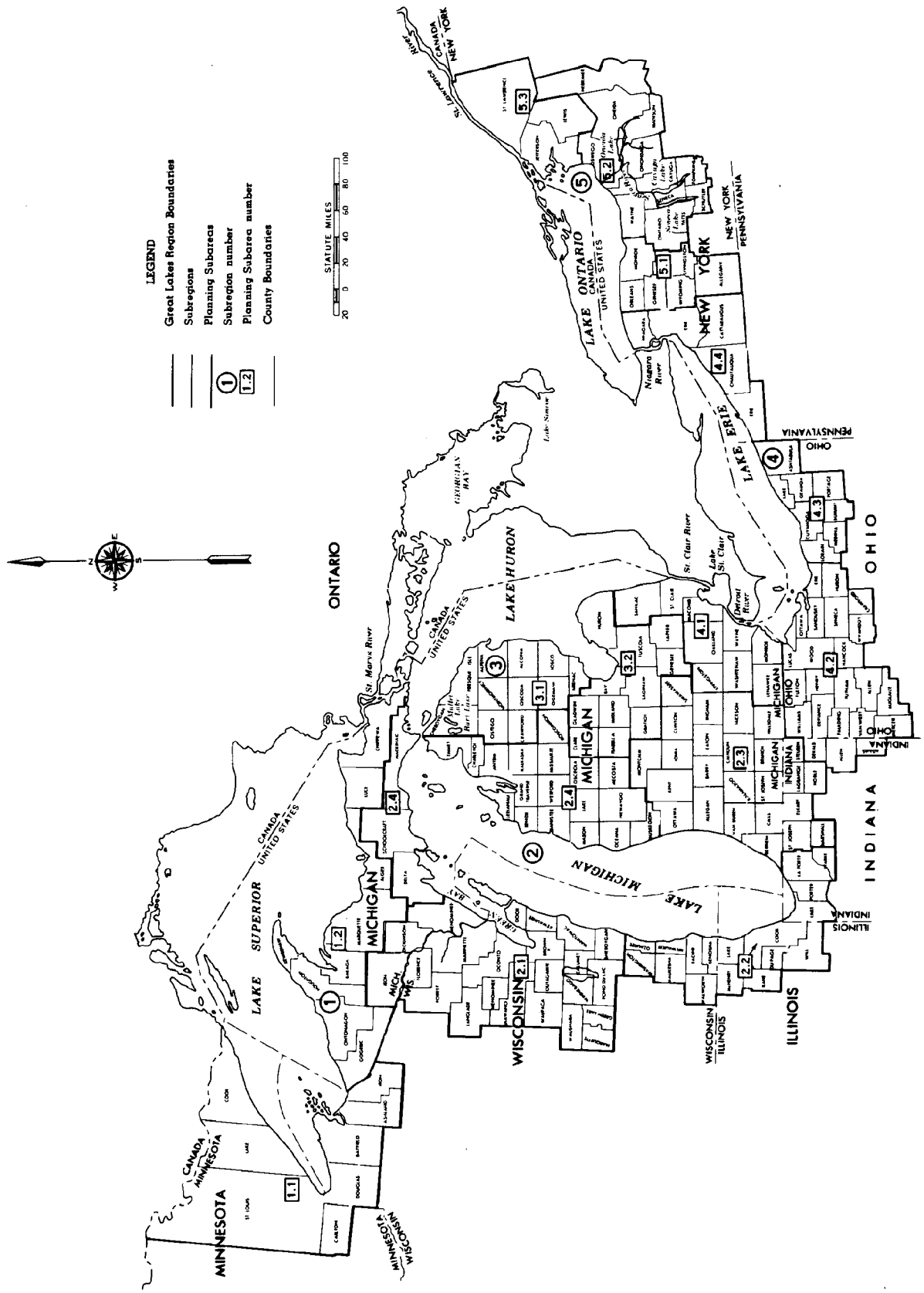
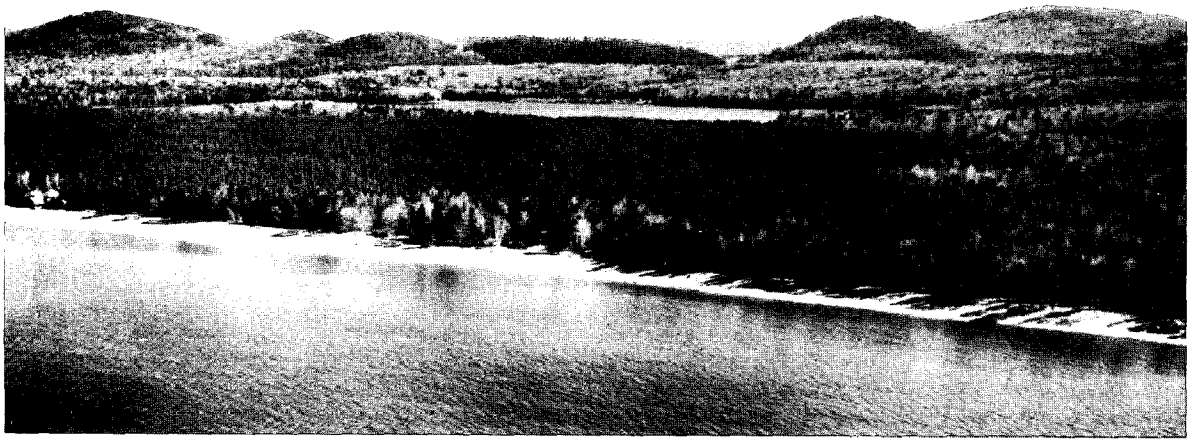


FIGURE 21–3 Great Lakes Region Showing Planning Subareas



Courtesy of National Park Service

FIGURE 21–4 Topography of the Great Lakes. The Great Lakes and adjacent lands, providing an excellent base for recreational opportunities, were shaped by continental glaciation.

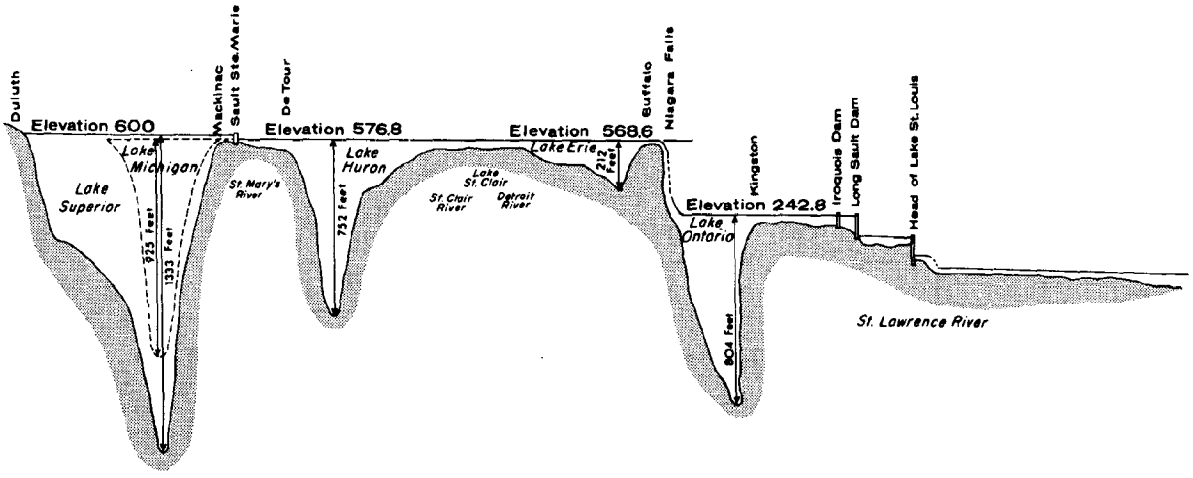


FIGURE 21–5 Longitudinal Profile of the Great Lakes at Low Water Datum

shorelines is illustrated by the perched wave-cut cliffs of Mackinac Island, the clay flats of the Chicago, Toledo, and Michigan Thumb areas, the variable stratified sands and silts constituting or overlying the bluffs along the Ohio shore of Lake Erie, and the sand tracts of the dune areas. Today, the Great Lakes contain 3,700 miles of mainland shores and 1,500 miles of island shores.

1.1.3 Climatology

Climatic conditions have a direct impact on recreation and will receive brief consideration in this appendix. While cool temperatures during the summer season adversely affect participation in swimming and water-skiing, the same cool temperatures may stimulate participation in fishing, hiking, and similar ac-

tivities. Rainy and windy weather greatly reduce participation in most recreational activities, such as boating, swimming, picnicking, and camping, especially tent camping. In winter, temperatures must be cold enough to permit the maintenance of an adequate snow or ice base for popular winter activities (Figure 21–6).

Due to its latitude, the Great Lakes Region could reasonably be expected to have severe climatic conditions, but because of the large surface area and depth of the Great Lakes, the Region experiences relatively temperate summer and winter temperatures. Average annual temperatures range from 39.0°F on Lake Superior to 48.7°F on Lake Erie.[13] Minimum monthly temperatures generally occur in January or February, while maximum monthly temperatures occur in July. Figures 21–7 and 21–8 give mean maximum isotherms for July and January, respectively.

Average monthly temperatures in January range from 8.7°F at Duluth to 26°F at Chicago, 26.9°F at Detroit, 27.6°F at Cleveland, and 24.5°F at Buffalo. In July, average monthly temperatures range from 65.5°F at Duluth and 64.6°F at Sault Sainte Marie to 75.6°F at Chicago, 74.4°F at Detroit, 71.5°F at Cleveland, and 69.8°F at Buffalo. Figures 21–9, 21–10, and 21–11 indicate average temperature and precipitation fluctuations for a 12-month period at Sault Sainte Marie, Michigan; Chicago, Illinois; and Buffalo, New York. Average daily high temperatures for July range from 77.1°F for Duluth and 75.6°F at Sault Sainte Marie to 84.1°F at Chicago, 83.9°F at Detroit, 82.8°F at Cleveland, and 80.1°F at Buffalo.[42]

Water surface temperatures influenced by air temperatures tend to either encourage or discourage water-dependent recreational activities. Within the Great Lakes Region, average monthly water surface temperatures of the five major Lakes during August range from approximately 55°F on Lake Superior to 73°F on Lake Erie.[12] Detailed water surface temperature data can be obtained from Appendix 4, *Limnology of Lakes and Embayments.*

The mean annual precipitation for the entire Region is 31 inches. The average annual precipitation varies from approximately 26

Courtesy of Michigan Tourist Council

FIGURE 21–6 Winter Recreation. Heavy snowfall provides excellent opportunities for skiing, sledding, and snowmobiling.

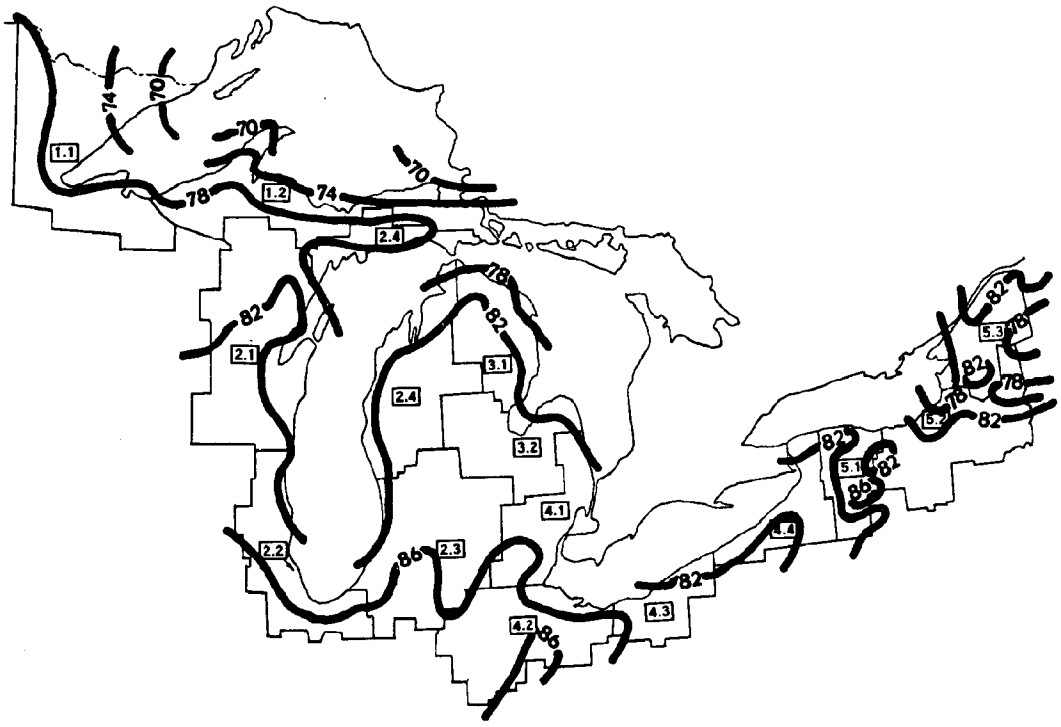


FIGURE 21–7 Mean Maximum Temperature (°F), July

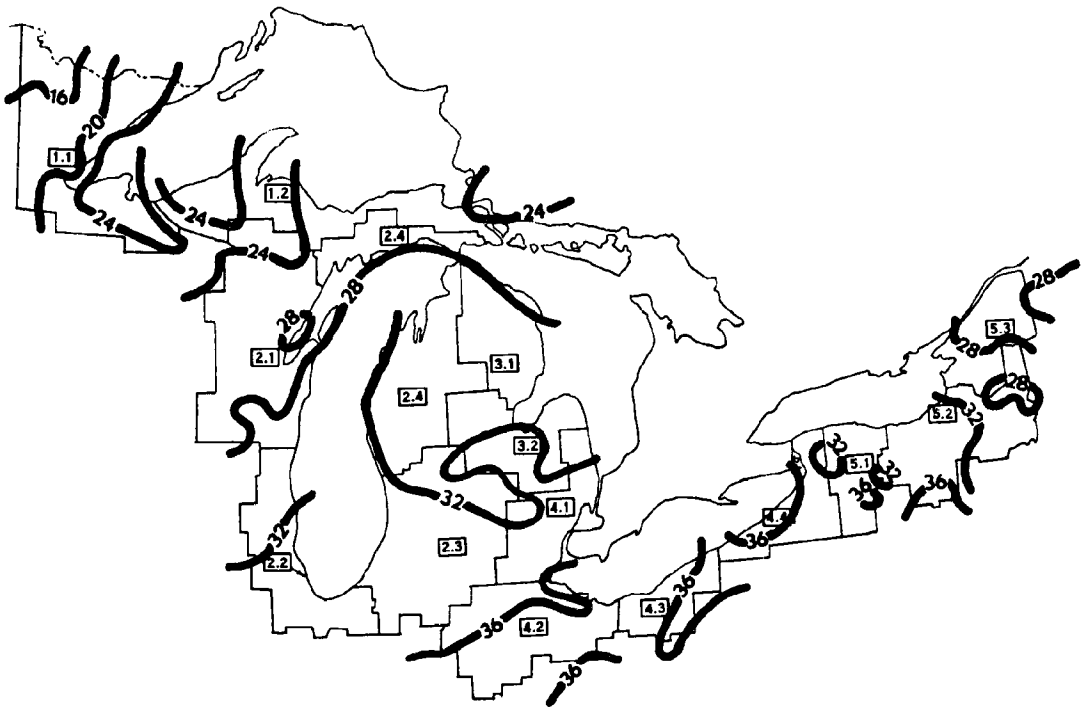


FIGURE 21–8 Mean Maximum Temperature (°F), January

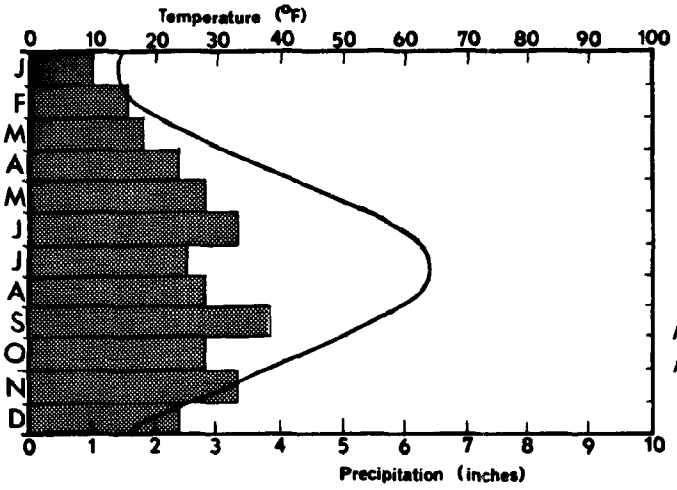


FIGURE 21–9 Average Monthly Temperatures and Precipitation for Sault Ste. Marie, Michigan

Average Annual Temperature: 40.6° F
Average Annual Precipitation: 31.2 inches

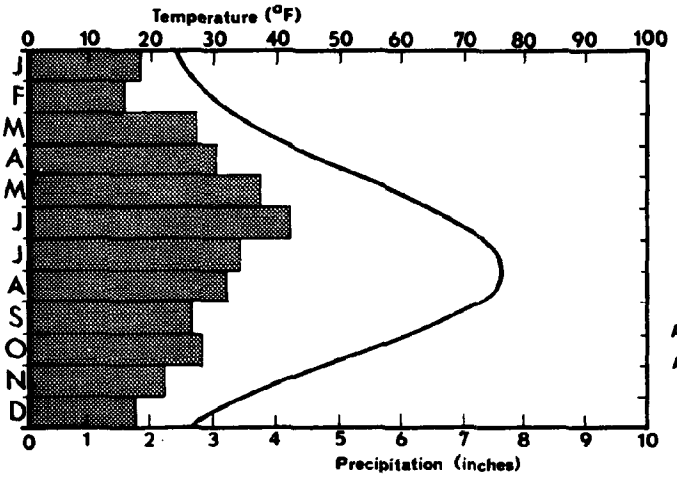


FIGURE 21–10 Average Monthly Temperatures and Precipitation for Chicago, Illinois

Average Annual Temperature: 50.8° F
Average Annual Precipitation: 33.2 inches

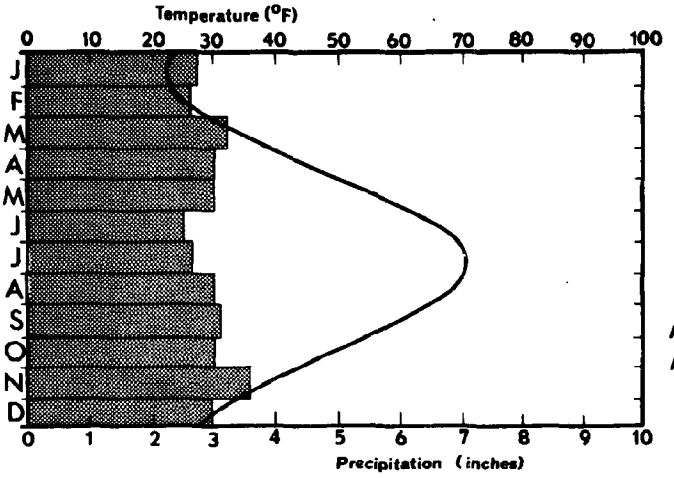


FIGURE 21–11 Average Monthly Temperatures and Precipitation for Buffalo, New York

Average Annual Temperature: 46.7°F
Average Annual Precipitation: 35.6 inches

inches in northeastern Minnesota to as much as 46 inches at the eastern end of Lake Ontario.[35] The number of days with measurable precipitation ranges from an average of 169 days east of Lake Ontario through 155 days along the southern shore of Lake Superior to 119 days at the southern end of Lake Michigan. During the peak recreation season of June, July, and August, days with measurable precipitation may total as many as 35 days in the Lake Superior area and as few as 26 days in the northwestern Lake Michigan area.[13]

Monthly variations in air temperatures and precipitation are responsible for cyclic fluctuations of water surface levels on the Great Lakes. These fluctuations are caused by retention of water during the winter on the watershed and release during spring and early summer. As runoff occurs, lake levels rise, reducing the beach areas that would otherwise be available for recreation.

1.1.4 Topography

The present land areas have an irregular and varied topography, including depressions occupied by small lakes or marshes, level to sloping plains, and low rolling hills or ridges. The Region contains thousands of natural lakes and a poorly developed surface drainage system with relatively flat stream profiles (Figure 21–12). River basin divides are characteristically broad and vary from almost level plains to rolling low hills. Only near the eastern and western ends of the Region is the relief more strongly expressed.

Elevations range from approximately 4,600 feet above sea level in the Adirondacks of New York to 152 feet above sea level along the St. Lawrence River. Mean surface elevations of the Great Lakes are 600.37 feet for Lake Superior, 578.68 feet for Lakes Michigan and Huron, 573.01 feet for Lake Erie, and 244.77 feet for Lake Ontario. Maximum recorded depths of the Lakes range from 1,333 feet in Lake Superior to 210 feet in Lake Erie.[13]

The absence of strongly developed relief in many parts of the Region limits the amount of land with characteristics that create high quality settings for recreational development, especially in the lake plains. As a result, many areas have only limited potential for the de-

Courtesy of U.S. Forest Service

FIGURE 21–12 Inland Lake. Silver Lake in the Superior National Forest of Minnesota is only one of the thousands of inland natural lakes in the Region.

velopment of recreational facilities with high quality aesthetic appeal.

1.1.5 Vegetation

The natural vegetational pattern of the Great Lakes Region has been greatly modified by man's activities. Virgin forest lands are almost nonexistent and much of the once-forested land, especially in the southern portions of the Region, has been replaced by urban, industrial, and agricultural development.

In the areas surrounding Lake Ontario, Lake Erie, southeastern Lake Huron, and southeastern Lake Michigan, the broadleaf deciduous tree (Figure 21–13), including oaks, hickories, yellow poplar, maples, and 50 or more other species,[58] is the predominant natural vegetation. Southwestern Lake Michigan borders on the eastern edge of the vast interior prairie grasslands. The western portion of the Lake Superior region is covered predominantly with stands of pine and spruce. Between these two major vegetational types (i.e., coniferous on the northwest side of the Region and hardwoods on the south and east), a transition zone is found in which there is a mixture of maple, yellow birch, hemlock, and pine.

Interspersed among these forested lands are bogs. In addition, beach areas support their own distinctive dunal vegetation, including grasses, cedar, balsam fir, and spruce.

The quantity and distribution of present forest lands and unique vegetation provide an aesthetically-pleasing setting for many of the traditional outdoor recreation activities such as camping, hiking, canoeing, hunting, fishing, nature study, and in the autumn, sightseeing tours through the wooded countryside.

1.1.6 Fish and Wildlife

A complete discussion of fish and wildlife resources and the hunting, fishing, nature study, and bird watching requirements placed on them can be found in Appendix 8, *Fish*, and Appendix 17, *Wildlife*. Much pleasure is derived from contact with these resources, even when their observation is secondary to the primary outdoor activity being enjoyed at the moment (Figure 21–14).

There are about 173 species of fish, 300 species of birds, and 63 species of mammals in

Courtesy of Michigan Tourist Council

FIGURE 21–13 Forest Cover. This provides an outstanding setting for many outdoor recreation activities.

Courtesy of Wisconsin Department of Natural Resources

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–14 Wildlife. An abundance of wildlife in the Great Lakes Region provides excellent opportunities for hunting, fishing, sightseeing, nature study, and photography.

the Great Lakes Region.[58] Thirty of the fish species are of commercial importance, and an equal number are of importance to sport fishermen. The whitefish family is most significant commercially, while trout, bass, panfish, walleye, pike, and the recently introduced chinook and coho salmon are of major interest to the angler.

Game birds found in the Region include ring-necked pheasants, ruffed grouse, geese, ducks, quail, and turkey (Figure 21–15). Typical shore and marsh birds include bitterns, rails, herons, loons, red-winged blackbirds, gulls, and terns.

Important game mammals include the white-tailed deer, black bear, cottontail and snowshoe rabbit, and tree squirrel. Other mammals include the gray wolf and moose—which maintain a very interesting ecological relationship in Michigan's Isle Royale National Park—and the elk.

1.1.7 Land Use and Ownership

A complete discussion of land use and ownership can be found in Appendix 13, *Land Use and Management*, but it is briefly presented in the following paragraphs because of its influence on the availability of lands and waters for public recreation.

The Great Lakes Region encompasses 86.5 million acres. Rivers, lakes (excluding the Great Lakes), and embayments amount to 2.9 million acres. The remaining 83.6 million acres have been divided among several primary land-use categories (Figure 21–16), including forest lands, cropland and pasture land, urban built-up lands, and other lands.[10]

The land-use pattern directly affects recreational opportunity and development. Of the 83.6 million acres of land, approximately 13.4 million acres of public land, 16.0 percent, are available for recreation.

The best potential for recreational lands is included in forest lands. Few areas classified as crop and pasture lands have such potential, and in most cases the potential is relatively low. Flood plains near urban areas are an exception, especially where they are incised into the surrounding till plain.

Approximately 67.2 million acres, or 80.4 percent of the total land area of the Region, are privately owned. Another 10.2 million

Courtesy of Wisconsin Department of Natural Resources

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–15 Game Birds. Typical birds found in the Region include ring-necked pheasants, ruffed grouse, geese, ducks, quail, and turkey.

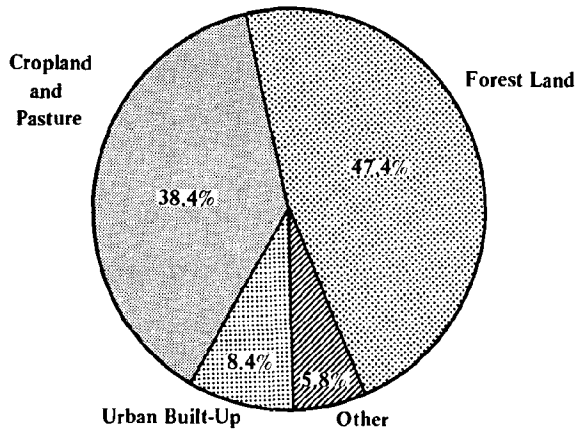


FIGURE 21–16 Primary Land Uses in the Great Lakes Region

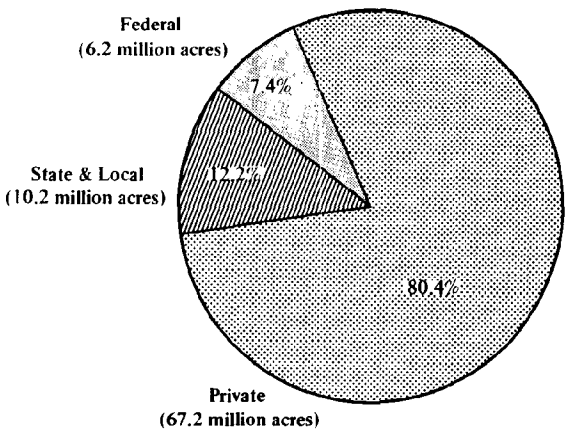


FIGURE 21–17 Land Ownership in the Great Lakes Region

acres (12.2 percent) are owned by State and local governments, and 6.2 million acres (7.4 percent) are Federally owned, as graphically illustrated in Figure 21–17. Many of the public lands are located in the northern and eastern portions of the Region and are divided among Federal, State, and local governments. These lands could provide a substantial base for additional weekend and vacation recreational facilities.

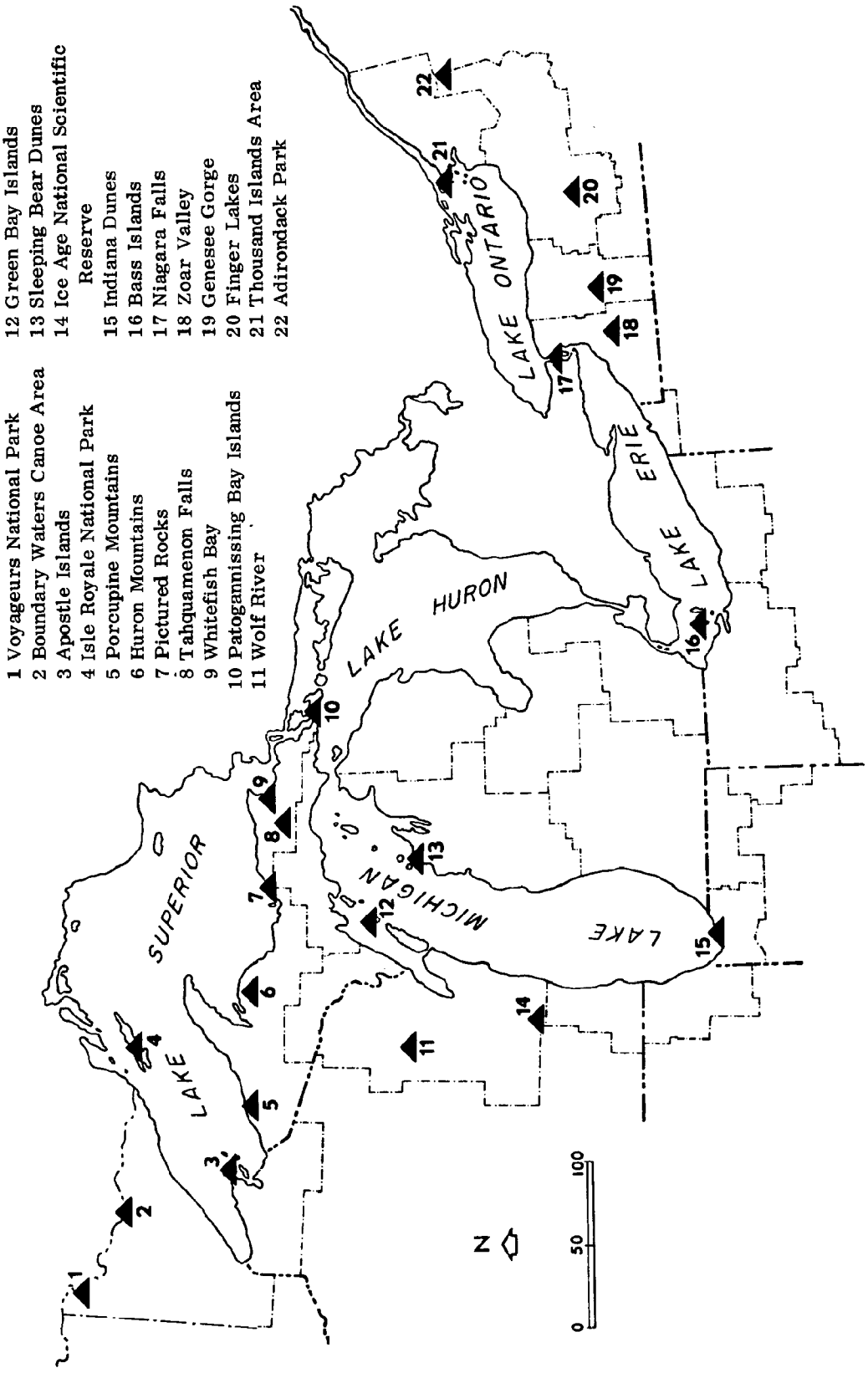


FIGURE 21–18 Selected Recreational Areas in the Great Lakes Region

1.1.8 Recreational Landscapes

The Great Lakes Region possesses diverse and outstanding natural features: Great Lakes water surface and shoreline, thousands of inland lakes and associated beaches, mountains and rolling morainic hills, extensive forests, streams and marshland with relatively high quality waters, and many islands, inlets and bays. While a few of these resources are near the large urban centers in the southern portion of the Region, most are located in the drainage areas of Lake Superior, Lake Ontario, and the northern parts of Lakes Michigan and Huron. This section will examine those features which now provide or have great potential for providing recreational opportunities in the Great Lakes Region. These features (Figure 21–18) serve as sites for weekend use and vacation use for both residents and non-residents of the Region.

1.1.8.1 Lake Superior Region

Among the superb recreational resources in this region are Isle Royale National Park, Boundary Waters Canoe Area, Voyageurs National Park, beaches of Whitefish Bay, dunes and cliffs of the Pictured Rocks National Lakeshore, Tahquamenon Falls, the Huron and Porcupine Mountains, and Apostle Islands National Lakeshore (Figure 21–19). During the long winter, much of the terrain provides an excellent setting for the winter sports enthusiast. The numerous inland lakes and streams, containing some of the highest quality waters east of the Mississippi River, and the extensive forests throughout the region also provide a resource base for outdoor recreation.

New recreational areas in the region could be developed in portions of more than six million acres of public forest land. Of this total,

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–19 The Apostle Islands National Lakeshore. Located on the south shore of Lake Superior, these islands provide an inspiring addition to our system of national lakeshores.

approximately 3.8 million acres are national forest, 1.5 million acres are State forest, and 650,000 acres are owned by local governments. Thousands of acres of lands owned by paper, mining, and power companies are also available for hunting, fishing, and other recreational activities. Rivers that have been included or identified for possible inclusion in a State scenic or natural rivers system include the Ontonagon, Presque Isle, Tahquamenon, and Two Hearted Rivers of Michigan.

1.1.8.2 Lake Michigan Region

Forested lands, large expanses of dunes and beaches, and hundreds of inland lakes are the natural foundations on which many of Lake Michigan region's outdoor recreation activities are built.

The forest is significant in the region's recreational attraction. More than four million acres of forest are publicly owned. Nearly two million acres are in national forests, 1.6 million acres in State forests, and one-half million acres are owned by local governments. From north to south, the extent of forest land decreases. Nearly 90 percent of the northern one-third of this region is forested. Less than 20 percent of the land is forested in the south. Approximately 40 percent of the forest land in Michigan's Upper Peninsula is publicly owned as is 35 percent in the northern Lower Peninsula.

Lake Michigan has some of the finest beaches on the Great Lakes, particularly along its eastern shore. Of the total 3,100 acres, 1,200 acres are publicly owned and available for use while an additional 1,200 privately owned acres have some potential for public use.[16]

Lake Michigan islands that provide an excellent base for recreational use and development include the Green Bay Islands, containing more than 22,000 acres of land in the northern part of the Lake; North and South Manitou Islands, included as part of the authorized Sleeping Bear Dunes National Lakeshore; and the Beaver Islands, an eight-island area which is approximately one-third publicly owned.

Within this region there are several areas that possess such high recreational value that Congress recently authorized their acquisition for the nation. Sleeping Bear Dunes National Lakeshore, Michigan (Figure 21–20); Indiana Dunes National Lakeshore, Indiana; and the

Courtesy of Michigan Department of Natural Resources

FIGURE 21–20 The Sleeping Bear Dunes National Lakeshore. This area offers a rich variety of quality recreational opportunities.

Ice Age National Scientific Reserve in Wisconsin are presently being acquired.

A portion of the Wolf River, Wisconsin, has been designated as part of the National Wild and Scenic Rivers System following enactment of the Wild and Scenic Rivers Act of 1968. Other rivers in the Lake Michigan region considered for designation as wild, scenic, or recreational rivers by either the Federal or respective State governments include the Pere Marquette, Little Manistee, Manistee, Pine, Escanaba, Whitefish, Manistique, and Muskegon in Michigan; the Pike, Pine, Wolf, Brule, and Popple Rivers in Wisconsin; the Fox River in Illinois, and the Elkhart in Indiana.

Although there are hundreds of inland lakes in the Lake Michigan region, the shores of many of them, especially in the southern part of the region, have been developed heavily with residences and summer cottages. These lakes have beach areas which probably total thousands of acres. Their water surface area is approximately 811,000 acres.

1.1.8.3 Lake Huron Region

Many pleasing aspects of the resource base are found in the Lake Huron region. Included are more than 400,000 acres of national forest, and nearly one and one-quarter million acres of State forests, many inland lakes, Lake Huron beaches, and rivers.

In the northern half of this region are extensive forests, many lakes and streams, the last areas of undeveloped Lake Huron shoreline, and a topography and climate conducive to winter sports. The Potagannissing Bay Islands at the north end of Lake Huron are considered to be one of the most attractive island groups in the Great Lakes.

In the southern half of this region, river valleys and forested areas in the north and glacial moraines in the south support heavy recreational activity. Although not as attractive as the northern half, the proximity of these rivers to large population concentrations offers exceptional opportunity for recreational development. The historic lake plain encircling Saginaw Bay lacks many natural resources necessary to provide varied recreational opportunities, yet the shoreline of Saginaw Bay is marshy and supports large numbers of waterfowl and fish species.

As in the Lake Michigan region, the shores of many inland lakes have been developed with residences and summer cottages. These lakes have many acres of beach, but their use is limited by lack of public access sites.

Of the more than 700 acres of beach along the western shore of Lake Huron, approximately 140 acres are publicly owned, but 13 acres are closed because of pollution. Another 50 acres may have potential for public use.[16]

The Au Sable, Carp, Black, Ocqueoc, and Rifle Rivers have been identified as potential scenic or natural rivers by Michigan. The Tittabawassee, Shiawassee, Flint, and Cass Rivers and their tributaries offer a significant recreation resource base.

1.1.8.4 Lake Erie Region

Perhaps the best recreational resources within the Lake Erie region are found within the Michigan portion. Rolling morainic terrain with wooded cover and numerous inland lakes provide the backdrop for outdoor activities. The rivers of this portion of the region also offer additional opportunity for recreational areas. The Huron and Clinton Rivers are especially significant for park development. Lake Erie, Lake St. Clair, the Detroit River, and St. Clair River provide a potentially valuable recreational frontage, although there are inherent problems that restrict full use. Industrial and residential development, often blighted, precludes public recreation in important areas. Pollution by the wastes from residential and industrial complexes has also seriously restricted the use of these waters. According to the Michigan Department of Health, mercury in Lake St. Clair threatens health, causes economic loss, and hinders fishing.[19]

The Maumee River basin is the most deficient in recreation resources of any river basin in the Lake Erie region. Recreational development is largely confined to the river valleys. From Toledo east to Buffalo, the greatest resource features are the Lake Erie shoreline and the major stream valleys. The western and southern shores of Lake Erie have more than 1,300 acres of beach. More than 600 acres are publicly owned and most are open to the public. However, approximately 40 acres in the vicinity of Cleveland, Detroit, and Buffalo are so polluted that they are now closed to swimming. Much remaining shoreline having beaches has been developed with residences, cottages, and industry.[16] As in the Lake Michigan region, overdevelopment of the shoreline and severe degradation of the water quality hinder public development and use of

this important resource. Industrialized portions of the Cuyahoga River in Cleveland, Ohio, are so polluted that they have periodically caught fire.

The Bass Islands north of Port Clinton, Ohio, have 6,000 acres of high recreational value. Within 250 miles of 21 million people, they have been used as a resort area for many years. Further east, on the armlike peninsula of Presque Isle, near Erie, Pennsylvania, is a 3,100-acre State park heavily used by both summer and winter recreationists.

The major stream valleys include the Sandusky, Vermilion, Black, Cuyahoga, Chagrin, and Grand in Ohio and the Cattaraugus in New York. The Sandusky River has already been designated as a scenic river by Ohio. The Chagrin has been proposed as a State scenic river. A major recreational complex has been planned on the Cuyahoga between Cleveland and Akron. A segment of the Maumee River has been listed as a potential addition to the National Wild and Scenic Rivers System.

In portions of northeast Ohio; Erie County, Pennsylvania; and Cattaraugus and Chautauqua Counties, New York, there are significant areas of rolling terrain with substantial wooded tracts. Niagara Falls (Figure 21–21), an important, world famous tourist attraction, and the Zoar Valley portion of Cattaraugus Creek, proposed for preservation by the Erie-Niagara Basin Regional Water Resources Planning Board, are also in the region.

1.1.8.5 Lake Ontario Region

The land and water resources of this region offer a variety of features important for recreation. Forest land is abundant and a portion of it is publicly owned. Inland lakes and rural landscapes offer scenic appeal to the tourist.

The Lake Ontario shoreline with its beaches, bluffs, sand dunes, inlets, and bays is a dominant recreational feature of the basin. Beach areas on Lake Ontario are less prominent than on any of the other Great Lakes. The total beach area is approximately 63 acres and only 33 acres are publicly owned. Further use of seven of these 33 acres has been precluded by pollution.[16]

The Thousand Islands area at the outlet of Lake Ontario into the St. Lawrence River has long been a prime tourist attraction. New York State and Canada both have developed substantial recreational facilities.

The headwater areas of streams, including the Finger Lakes area and Genesee Gorge,

Courtesy of U.S. Army Corps of Engineers

FIGURE 21–21 Niagara Falls. One of the most significant tourist attractions in the Great Lakes Region is Niagara Falls.

that drain into Lake Ontario from the south have much rolling terrain. The eastern end of this region extends into the western part of the Adirondack Park and includes much rugged relief covered with forests and lakes.

1.2 Socioeconomic Features of the Great Lakes Region

The requirements for outdoor recreation are affected by age, population, educational level, income, employment, health, sex ratio, leisure time, and mobility, as well as other factors. Some are important in influencing participation in most activities while other factors influence only a few. The following deals with those socioeconomic factors influencing participation within the Great Lakes Region.

1.2.1 Population

The counties included in the Great Lakes Region study area had a 1970 population of 29,013,299.[9] Most of this population was concentrated along the shores of Lakes Michigan and Erie in the Region's southern portion. Approximately 80 percent of the population resided in Planning Subareas 2.2, 2.3, 4.1, 4.2, 4.3, and 4.4. Figure 21–22 gives the distribution of population by planning subarea and Figure 21–23 presents population density by county.

In 1970, 83 percent of the Region's population resided in 29 Standard Metropolitan Statistical Areas (SMSAs), (Figure 21–24). Five of the SMSAs had populations exceeding 1,000,000 with Chicago being the largest. The Lake Erie region was the most urbanized with 88 percent of its population residing in SMSAs. The Lake Superior region was the least urbanized with approximately half of its population in SMSAs.

The Region's population is projected to be 53,496,300 by 2020, an increase of approximately 84 percent from 1970. During this fifty-year period, population increases (Figure 21–25) are expected to range from 4.7 percent in Planning Subarea 1.2 to 99.1 percent in Planning Subareas 4.1 and 4.2.[9]

Over the past decade the national population growth rate decreased. If the population growth rate should continue to decline until zero population growth is attained (as strongly advocated by many people), then the requirements for additional recreation lands and facilities will be less than the requirements projected in this report. Over a long period of time such a change would result in an increase of the average age of the population. Even if a zero population growth rate becomes a reality, the total population of the nation will continue to rise, stabilizing at nearly 300 million. Thus, needs for recreational facilities will grow for many years, but at a slower rate.

1.2.2 Income

The factor of income is an important one. The Outdoor Recreation Resources Review Commission's (ORRRC) summary report, entitled "Outdoor Recreation for America," states that participation in outdoor recreation activities tends to increase as income rises to a given level.[40] Many other socioeconomic factors such as education, age, occupation, and health, work together to produce different patterns of participation within income groups.

In addition to the indicated differences among present and future population, there is also a noticeable variation in incomes throughout the Great Lakes Region. The lower average incomes occur in the predominantly rural areas in the northern portions of the Region, while the higher average incomes are associated with the large urban populations in the southern half of the Region. Income in 1970 ranged from $1,944 per capita in Planning Subarea 3.1 to $3,726 per capita in Planning Subarea 2.2. Average per capita income in 1970 for the Great Lakes Region was $3,353, which was above the United States average of $3,046. By the year 2020, average per capita income for the Region is expected to reach $12,754. The projected per capita income of $13,613 for Planning Subarea 5.1 is expected to be the highest in the Region while that in Planning Subarea 3.1 is expected to reach only $8,776.[9] Figure 21–26 graphically presents 1970 and 2020 per capita income by planning subarea.

It must be stressed that average per capita income often obscures great economic disparities within an area. For example some urbanites, such as ghetto dwellers and retired people, have very low per capita incomes. Because of their economic condition and the general scarcity of available recreational opportunities, their participation in recreational activities is much lower than the national or Regional average. With increased opportunity, either through the development of park areas in the inner city or through increased

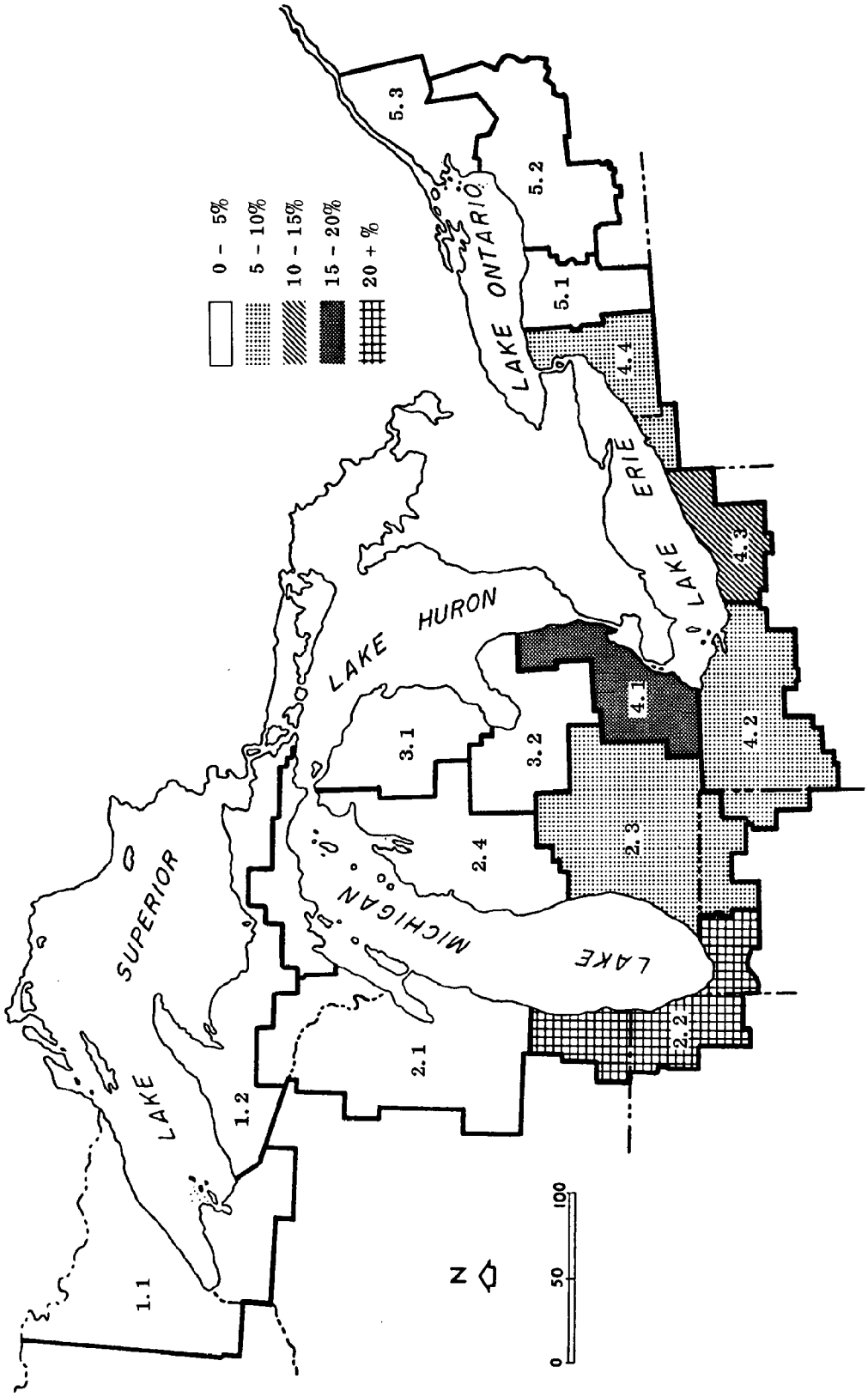


FIGURE 21–22 Population Distribution by Planning Subarea

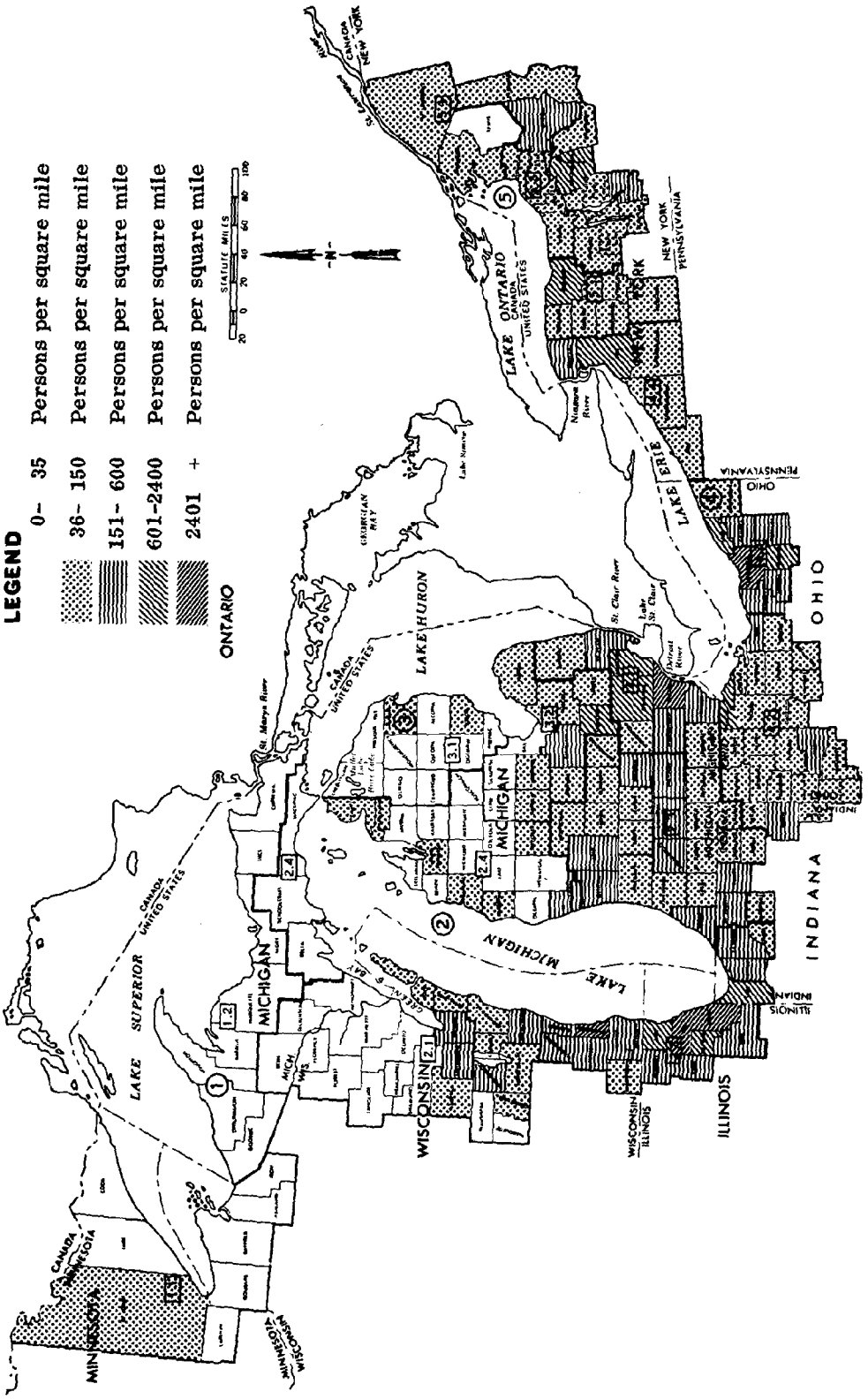


FIGURE 21–23 Population per Square Mile for Great Lakes Region Counties

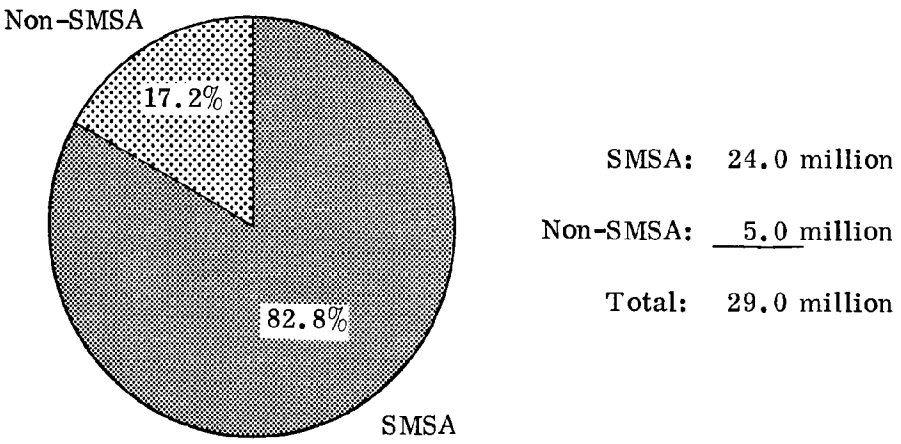


FIGURE 21-24 1970 SMSA and Non-SMSA Population in the Great Lakes Region

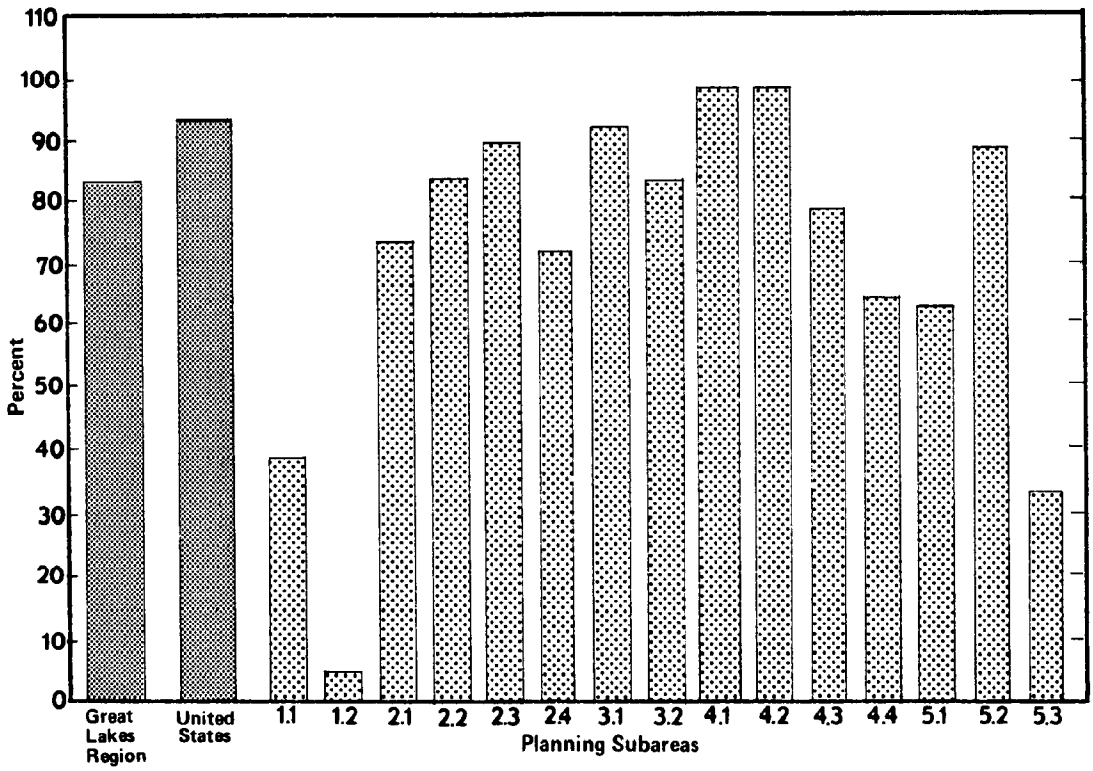


FIGURE 21-25 Projected Percentage Population Changes by Planning Subarea in the Great Lakes Region Between 1970 and 2020

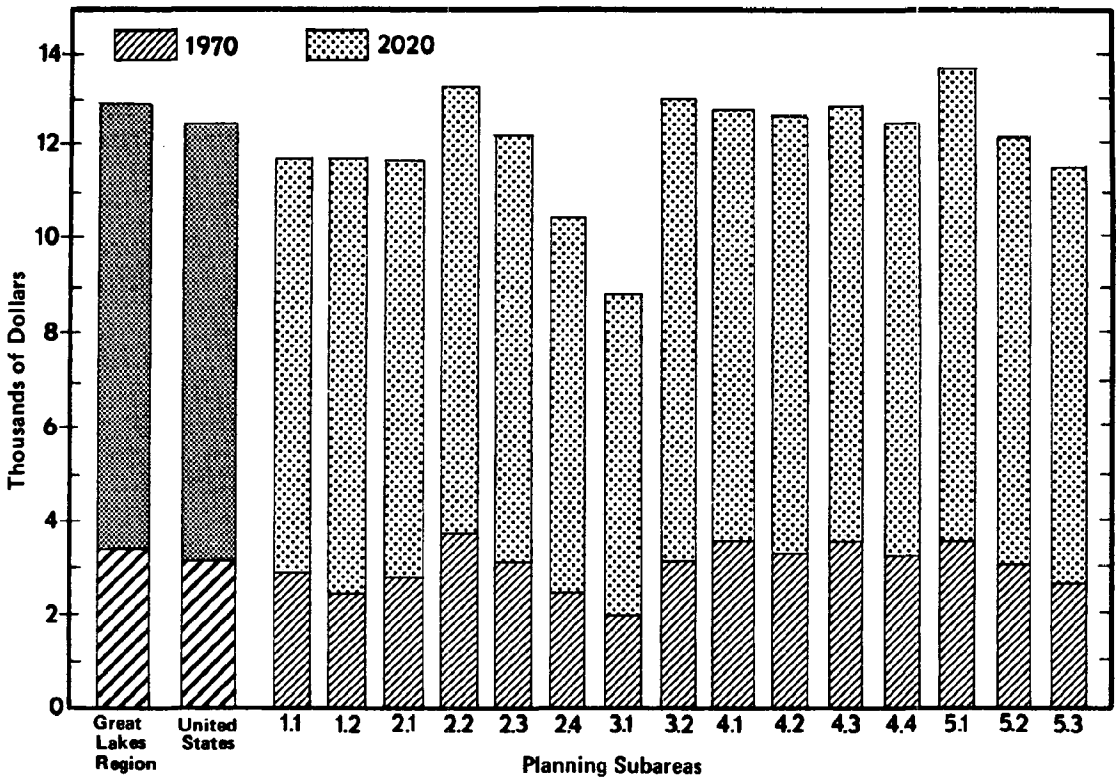


FIGURE 21-26 Projected 1970 and 2020 Per Capita Income by Planning Subarea

per capita annual income, their participation rates will rise. Any substantial improvement in the economic situation of inner-city dwellers would result in a significant increase in requirements for recreational opportunities in or near major urban areas.

1.2.3 Employment

Some occupations, through shorter working hours, longer vacations, more holidays, and higher income, permit greater outdoor recreational participation than do other occupations.

In 1970, the Great Lakes Region had a labor force of almost 12 million. It was distributed among the various industries as follows: agriculture, forestry, and fisheries, 2.1 percent; mining, 0.3 percent; manufacturing, 35.9 percent; Federal military, 0.6 percent; and other transportation, communications, public utilities, finance, insurance, real estate, public administration, contract construction, and wholesale and retail trade, 61.2 percent.[9] A visual comparison is available in Figure 21-27.

While total employment is projected to more than double by the year 2020, certain industries such as agriculture, forestry, fisheries, and mining are expected to lose employees. Manufacturing and the "other" category are expected to grow substantially. It is projected that by 2020, the labor force of 21,662,300 will be distributed as follows: agriculture, forestry, fisheries, and mining, less than one percent; manufacturing, 27 percent; Federal military, less than one percent; and other, 72 percent.[9] This pattern is similar to the national trend.

1.2.4 Leisure Time

In 1962, the ORRRC studies indicated that at least one-fifth of all free time was spent in outdoor recreation activities, implying a tremendous impact on recreational resources and facilities. Generally, most people will have more leisure time (Figure 21-28) in the future. The average work week decreased from 70 hours in 1820 to 39 hours in 1960, and is expected to decline to 36 hours by 1976 and 32

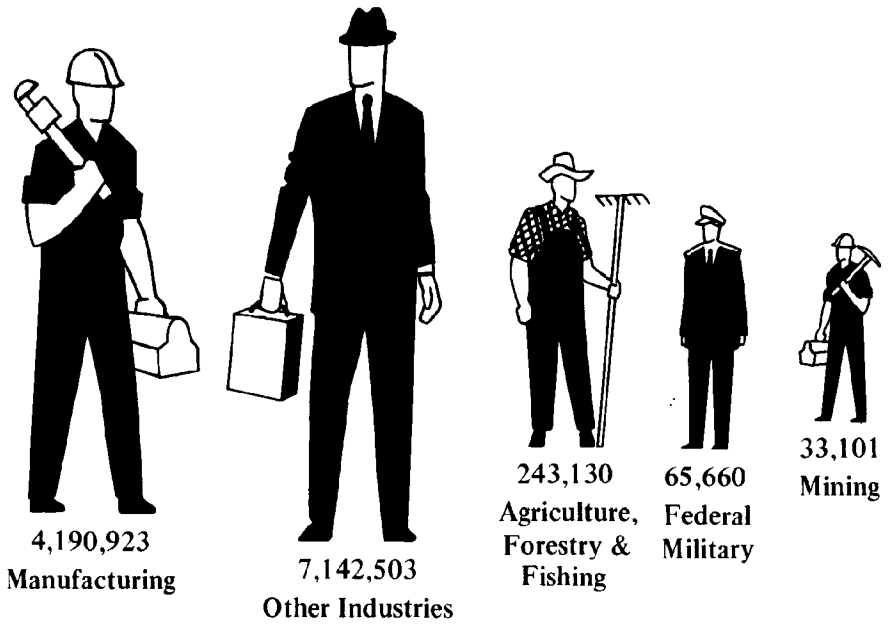


FIGURE 21–27 1970 Employment in the Great Lakes Region. Other industries include construction, transportation, communications, public utilities, wholesale and retail trade, finance, insurance, real estate, services, and public administration.

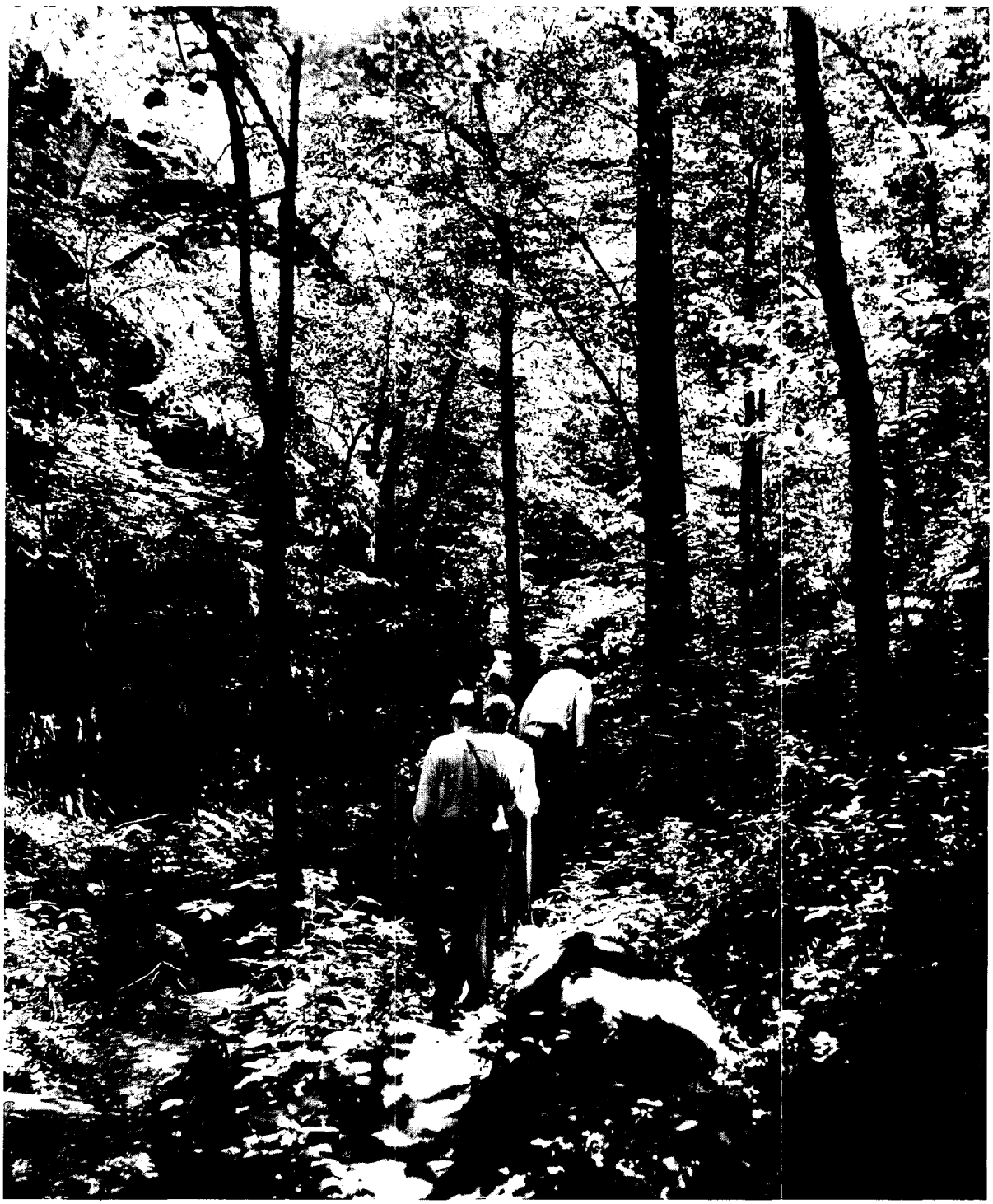
hours by the year 2000. The length of paid vacations and number of persons receiving paid vacations are expected to continue increasing. These increases will account for a one-third gain in leisure time to the average employed person. The average age of retirement is dropping and retirement pensions are increasing, giving more time and money for recreation. A few scattered businesses are already providing their employees with four-day work weeks. The computer section of one eastern firm presently uses a three twelve-hour-day work week. These trends may be forerunners of changes to come. The possibility of year-around class sessions for children also exists. Should this happen, the leisure habits of many Americans will be altered. The normal summer recreation season can be expected to lengthen, with many families taking their annual vacations in the spring or fall.

1.2.5 Highway System

The Region's highways are an essential link between major population centers and the recreational resources serving those areas. The highway system controls the location of certain developments and often limits the amount and type of use of specific areas.

Interstate highways running in an east-west direction include I-90 extending east through upstate New York and west through the Chicago area, I-80 passing from eastern Ohio through the Chicago area, I-94 from Detroit through the Chicago area and north to Milwaukee, and I-96 from Detroit to the eastern shore of Lake Michigan at Muskegon. North-south interstate highways shown on Figure 21-29 include I-81 across the eastern end of Lake Ontario, I-71 extending south from Cleveland to other major population centers in Ohio, I-75 passing through western Ohio to Detroit and north to the Mackinac Bridge (Figure 21-30), I-69 through Fort Wayne and north to central Michigan at Lansing, and I-196 along Lake Michigan's eastern shore.

The entire Great Lakes Region is also interlaced with an excellent system of major State and local highways providing easy access between population centers and principal recreation areas.



Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–28 Use of Leisure Time. As the amount of leisure time increases, the more remote areas of the Great Lakes Region will receive greater recreational pressures.

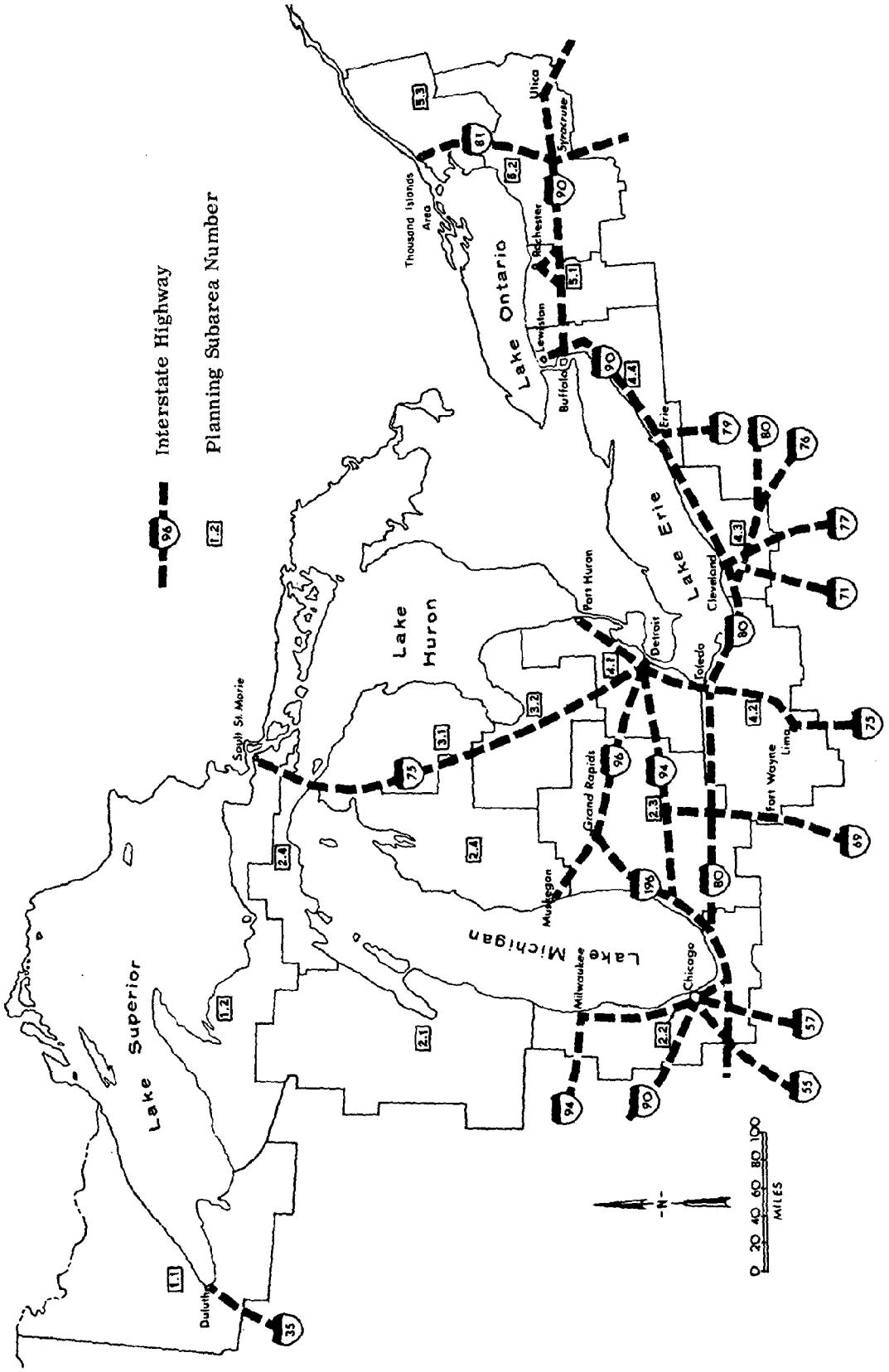
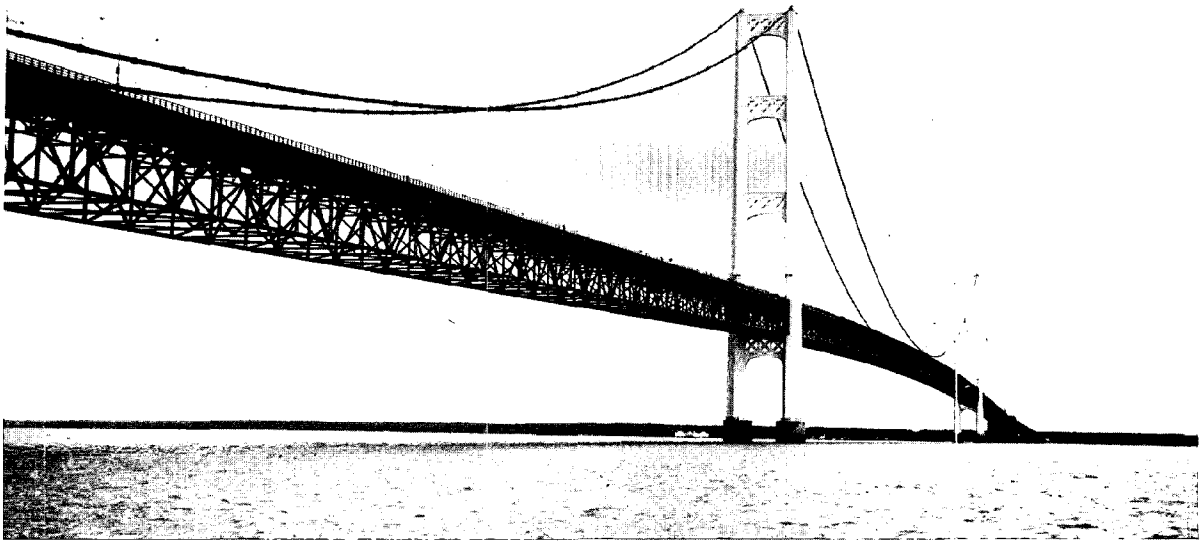


FIGURE 21-29 Interstate Highway System—Great Lakes Region



Courtesy of Michigan Tourist Council

FIGURE 21–30 The Mackinac Bridge. This bridge connects the recreational resources of the north with the populated areas of the south.

1.2.6 Other Socioeconomic Factors

Other socioeconomic factors affect requirements for outdoor recreation in varying degrees in less tangible ways than population, income, employment, and leisure time. Age composition, sex ratio, educational level, health, and place of residence are interrelated with one another and with the primary socioeconomic characteristics described earlier.

The Outdoor Recreation Resources Review Commission reported that education influences participation in much the same way as income: the more education the higher the rate of participation.

Suburbanites also have higher participation rates in most outdoor recreation activities than city residents and farm dwellers. Age has a distinct influence on participation in the various activities. For example, swimming and bicycling are primarily activities of the young, while camping, fishing, sightseeing, and walking for pleasure are less affected by age. In addition, healthier people tend to participate more in all forms of outdoor recreation. Variations in participation due to sex are limited to certain activities such as hunting and fishing.

Section 2

GENERAL RECREATION REQUIREMENTS, SUPPLY, AND NEEDS IN THE GREAT LAKES REGION

2.1 Introduction

Recreational resources and developments required to meet current and future needs for outdoor recreation in the Great Lakes Region were determined in the following manner:

(1) The Great Lakes Region was divided into five smaller regions, each the approximate watershed of one of the Great Lakes. These Lake regions were broken down into 15 planning subareas—two in the Lake Superior region, four in the Lake Michigan region, two in the Lake Huron region, four in the Lake Erie region, and three in the Lake Ontario region (see Figure 21-3).

(2) Present and future requirements for outdoor recreation opportunities were computed for each planning subarea.

(3) The existing and projected supply of recreational developments was determined for each of the planning subareas.

(4) The supply was then subtracted from the recreational requirements to give needs for each planning subarea.

(5) The recreation data of the 15 planning subareas were aggregated for the entire Great Lakes Region.

2.2 Recreation Requirements

Recreational requirement is defined as the total participation in outdoor recreation activities that could be expected if adequate opportunities were available. Requirement differs from demand, in an economic sense, because it is the amount of recreational opportunities that a population will require under a specific set of conditions. Demand is the amount of goods or services which a given population will utilize over a range of prices. Theoretically, as price of a good or service increases, the quantity taken decreases, with the amount of decrease dependent upon the elasticity of demand for that good or service. Because many recreational opportunities are provided with public funds at little or no direct cost to the public, a true demand schedule for each recreational activity cannot be easily developed. The term "requirement" is, therefore, used in this study to avoid confusion with the term "demand."

The methodology used in this report to determine the recreational requirements of the Great Lakes Region includes: identification of recreation activities, estimation of effective population for each of the target dates, identification of activity participation rates for each of the target dates, establishment of design load standards, and calculation of requirements by activity in recreation days and in acres or miles.

2.2.1 Recreation Activities

Twenty-one activities were used to calculate outdoor recreation requirements: swimming, picnicking, camping, sightseeing, hiking, nature study, boating, sailing, canoeing, water-skiing, playing outdoor games, golfing, bicycling, horseback riding, skiing, sledding, ice skating, driving for pleasure, walking for pleasure, attending outdoor games, and attending outdoor concerts (Figure 21-31).

For evaluation, these activities were broken down into five major categories: land-based water-oriented activities, land-based general activities, water surface activities, winter activities, and other activities. Land-based water-oriented activities are those recreational activities normally occurring on land but enhanced by water: picnicking, camping, nature trails, hiking, and sightseeing. Land-based general activities are those not primarily dependent upon water: outdoor games, golf, bicycling, and horseback riding. Water surface activities are water-dependent: swimming, boating, water-skiing, canoeing, and sailing. Winter activities are those dependent on adequate snow cover or ice: skiing, sledding, and ice skating. The final category,

Courtesy of Michigan Tourist Council

Wisconsin Department of Natural Resources

Courtesy of Michigan Tourist Council

Courtesy of Wisconsin Department of Natural Resources

Wisconsin Department of Natural Resources

FIGURE 21–31 Some Outdoor Recreation Activities. Outdoor recreation activities on lands with little development.

listed as "other activities," includes those in which the participant is relatively passive: driving for pleasure, walking for pleasure, attending outdoor sports events, and attending outdoor concerts.

In calculating land needed for bicycling and horseback riding it was assumed that only 25 percent of the total requirement would be satisfied in recreational areas. It was assumed that sidewalks, public roads and streets, and private land would absorb 75 percent of the requirement. Because no supply data were available on driving for pleasure, walking for pleasure, attending outdoor games, and attending outdoor concerts, no attempt was made to estimate the land needed to meet requirements for these activities.

Not included on the list of recreational activities are hunting, fishing, and the recreational use of snowmobiles and all-terrain vehicles (ATVs). Appendix 8, *Fish*, and Appendix 17, *Wildlife*, consider the requirements and needs for fishing and hunting. Because snowmobiles and all-terrain vehicles have only recently become popular, regional participation rates have not yet been developed. Thus, it is not possible at this time to establish needs for these two activities within the Great Lakes Region. Recreational boating was considered in greater detail in Appendix R9, *Recreational Boating.*

2.2.2 Effective Population

Effective population is defined as the number of people expected to contribute to the recreational requirements of a resource area. A prerequisite to its computation is the determination of the recreation market area and the recreation service area.

2.2.2.1 Recreation Market Area

The recreation market area is defined as the origin area of 80 percent or more of the recreationists on one-day outings or weekend trips to a given resource area. The recreation market area for the Great Lakes Region is the Region itself, meaning that a large part of the impact placed upon the Great Lakes Region results from its own population.

2.2.2.2 Recreation Service Area

The recreation service area extends out from a population center in a specific geographic area and encompasses the recreational resources which serve or are expected to serve the residents of that geographic area. In this report the centers of recreation service areas are those weighted population centers of the Office of Business Economics (OBE) economic areas which are either in or within 250 miles of the Great Lakes Region. The type of recreational excursion determines the boundaries of a recreation service area. The day-use area extends 50 miles from the weighted population center, the weekend-use area 150 miles, and the vacation-use area 250 miles.

The number of persons and their place of residence determine the effective population in the Region. In 1970 there were 29 SMSAs in the Region with a total population of approximately 24 million. These large urban areas accounted for 83 percent of the Region's total resident population of more than 29 million people. In this study the impact of non-Regional residents on recreational resources within the Region was accommodated by considering a portion of such people to be part of the effective population. A varying percentage of all people living in the population centroids of the Office of Business Economics economic areas within 250 miles of the Region was included in the effective population. A portion of the population within the Region was allocated to other Regions using the same basic principle. The 1970 effective population for the entire Region amounted to nearly 23 million people, 76 percent living in SMSAs in and adjacent to the Region.

A detailed discussion of the methodology for calculation of effective population using recreation market areas and recreation service areas is contained in Annex A, Estimation of Effective Population. Annex I, Supplementary Statistical Tables, gives both the effective population of each of the 15 planning subareas for the target years 1970, 1980, 2000, and 2020, and the percent of each planning subarea's 1970 effective population drawn from Standard Metropolitan Statistical Areas.

2.2.3 Activity Participation Rates

Because a number of complex variables interact to determine the amount of participation in outdoor recreation, establishing accurate participation rates for each activity is difficult. Also, research studies in outdoor recreation do not agree on which variables are the

most important. The Outdoor Recreation Resources Review Commission's (ORRRC) Study Report Number 26 considered increased leisure time, income, and mobility as the important variables.[40] Clawson cited increased population, life expectancy, changes in age distribution, population shifts from rural to urban areas, and increased leisure time as important variables.[5] The climate of the area under study has a substantial effect upon certain recreational activities. Also, increased opportunities for a given recreational activity will greatly alter participation in that activity.

While individual researchers cite different variables as most important, the consensus is that leisure time, income, mobility, and population are primary. Substantial increases are predicted for these four variables, which will increase participation in outdoor recreation activities. The average work week is expected to decrease from 39 hours in 1960 to 32 hours by 2000.[41] This decrease, coupled with predicted increases in paid vacations and holidays, is anticipated to account for a one-third gain in available leisure time. Similarly, national per capita income is projected to increase more than four times between 1970 and 2020,[66] while per capita income in the Region is expected to increase 3.8 times.

The average person in the United States presently travels 5,000 miles per year and is expected to travel at least 9,000 miles per year by the year 2000.[2] Improved highways and the development of more economical and rapid modes of transportation will bring today's more remote outdoor recreation facilities within reach of population centers.

Changes in population composition as well as predicted population increases play a dominant role in estimating future outdoor recreation requirements. The impact of the other three primary variables cannot be fully appreciated unless viewed in conjunction with present and projected populations. In the Region the population is expected to increase from 29 million in 1970 to 53 million by 2020.

In this report the degree of visitor participation in each activity was derived from data developed by the Bureau of Outdoor Recreation for use in the Nationwide Plan for Recreation, from population data of the Bureau of the Census, and from data published in the ORRRC Study Report Number 19. Annex B, Identification of Participation Rates, contains a detailed explanation of the methodology used to determine activity participation rates. The annual and summer per capita participation rates of each of the 21 outdoor recreation activities for the years 1965, 1980, 2000, and 2020 are listed in Annex I, Supplementary Statistical Tables.

2.2.4 Recreation Activity Occasions

The recreational requirements of any resource area can be expressed in recreation activity occasions. The required activity occasions for each recreational activity is the product of the area's effective population and the per capita participation rate for that activity. The resource area's overall requirement for recreation activity occasions is the sum of its requirements for each recreational activity. Annex C, Calculation of Recreational Requirements, explains the methodology for determining recreational requirements. Annex I, Supplementary Statistical Tables, gives the 1970–2020 requirements in activity occasions for each planning subarea.

2.2.5 Present Requirements in Recreation Days

In this report the recreational requirements of the Great Lakes Region are expressed in recreation days. By definition, 2.5 recreation activity occasions equal one recreation day. This means that to compute recreation days from recreation activity occasions, the activity occasions are multiplied by 0.4.

Table 21–1 contains the 1970 outdoor recreational requirements for each planning

TABLE 21–1 Summary of Annual Requirements in Recreation Days by Planning Subarea 1970–2020 (in thousands)

Planning Subarea	1970	1980	2000	2020
1.1	9,959	12,897	17,982	24,278
1.2	4,595	5,862	7,604	10,069
2.1	38,270	51,091	77,884	114,037
2.2	170,301	230,932	348,705	497,055
2.3	71,452	96,681	145,248	210,932
2.4	18,214	24,366	36,289	52,360
3.1	7,700	10,449	15,854	21,591
3.2	31,197	42,718	65,205	94,443
4.1	85,398	117,492	180,873	263,893
4.2	45,943	62,927	97,031	141,499
4.3	58,821	78,816	117,554	168,154
4.4	27,820	36,856	53,956	75,288
5.1	21,648	28,598	41,417	58,627
5.2	37,177	50,075	75,006	106,907
5.3	8,672	11,656	17,465	24,654
TOTAL	637,167	861,416	1,298,073	1,863,787

subarea in recreation days. The total requirements are approximately 637 million recreation days for the Great Lakes Region. Planning Subarea 2.2 had a 1970 recreation-day requirement twice as great as that of any other planning subarea. Seventy-six percent of the 1970 recreation-day requirement of the entire Great Lakes Region is generated by SMSAs. Table 21–2 gives the requirement due to SMSA by planning subarea.

Figure 21–32 gives the 1970 total, urban, and nonurban recreation-day requirements for the Great Lakes Region by major activity category. The categories with the greatest outdoor recreation requirements are the land-based general activities (outdoor games, golf, bicycling, and horseback riding) and "other activities" (driving for pleasure, walking for pleasure, attending outdoor sports events, and attending outdoor concerts).

Table 21–3 contains the 1970 recreation-day requirement for each outdoor activity within the Great Lakes Region. The greatest activity requirement is for outdoor games, followed in order by driving for pleasure, walking for pleasure, and swimming.

TABLE 21–2 Summary of Annual Requirements in Recreation Days Derived from SMSAs by Planning Subarea, 1970

Planning Subarea	Percent of effective population from SMSAs	1970 SMSAs Requirements (1000s)
1.1	48.5	4,830
1.2	3.6	165
2.1	34.1	13,050
2.2	89.1	151,737
2.3	70.6	50,721
2.4	62.2	11,440
3.1	55.6	4,281
3.2	74.4	23,211
4.1	92.2	78,878
4.2	72.2	33,309
4.3	80.1	47,115
4.4	69.5	19,336
5.1	75.8	16,408
5.2	72.9	27,101
5.3	53.9	4,675
TOTAL	76.0	486,257

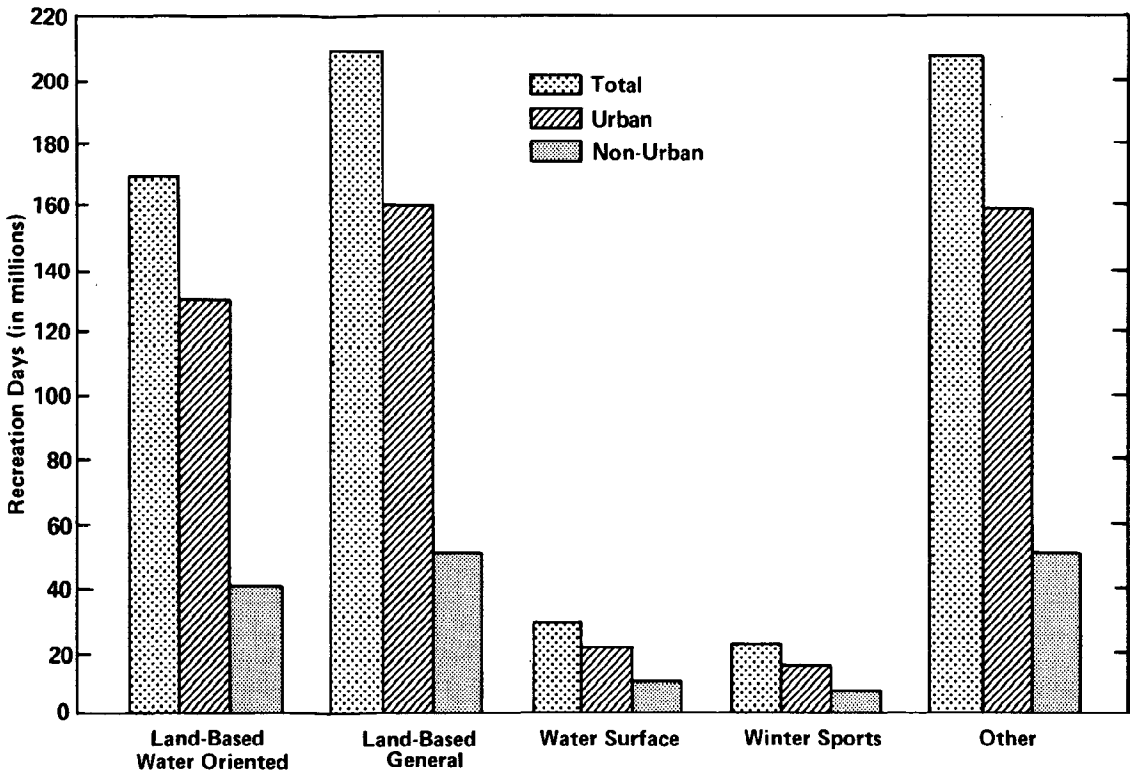


FIGURE 21–32 1970 Total, Urban, and Non-Urban Annual Requirements by Major Activity Group

TABLE 21-3 Summary of Annual Requirements in Recreation Days by Activity (in millions)

Activity	1970	1980	2000	2020
Land Based-Water Oriented				
Swimming	64.8	94.9	149.0	213.9
Beach Swimming	35.7	52.2	82.0	117.6
Picnicking	38.8	48.9	67.0	91.6
Camping	8.2	13.0	21.2	33.5
Nature Trails	9.4	11.8	15.9	21.7
Hiking	3.9	6.2	9.7	14.3
Sightseeing	44.6	60.2	90.3	132.7
Subtotal	169.7	235.0	353.1	507.7
Land Based-Other				
Outdoor Games	126.3	186.3	314.2	469.0
Golf	13.0	19.0	32.7	47.6
Bicycling	60.7	72.7	98.7	134.7
25% on Public Lands	15.1	18.2	24.7	32.7
Horseback Riding	8.3	10.5	15.2	22.2
25% on Public Lands	2.1	2.6	3.8	5.6
Subtotal	208.3	292.5	460.8	673.5
Water Surface				
Boating	21.9	32.4	51.1	77.2
Water Skiing	3.9	6.9	12.5	20.7
Canoeing	1.4	2.2	3.4	5.2
Sailing	1.3	1.9	3.0	4.9
Subtotal	28.5	43.4	70.0	107.9
Winter Sports				
Skiing	2.3	2.4	3.1	3.9
Sledding	11.2	14.2	22.8	35.7
Ice Skating	9.3	14.6	24.0	37.2
Subtotal	22.8	31.2	49.9	76.8
Other Activities				
Driving for Pleasure	99.3	126.1	169.2	223.7
Walking for Pleasure	75.5	93.5	132.5	185.9
Attending Outdoor Games	29.0	37.9	53.4	74.8
Attending Outdoor Concerts	4.0	5.7	9.0	13.2
Subtotal	207.8	263.2	364.1	497.6
TOTAL	637.1	861.3	1,297.9	1,863.6

Participation rates have been determined for the activities included in these categories. An important activity not included in the estimates of requirements is snowmobiling. The 1968 *Minnesota State Comprehensive Outdoor Recreation Plan* estimates that snowmobiling accounted for approximately six million activity occasions in 1967.[28] This is equivalent to more than two million recreation days. Another activity which is growing in importance, but for which participation data are lacking, is the use of all-terrain vehicles (ATVs). Increased use of ATVs and snowmobiles may create problems greater than simply providing adequate facilities. While the total impact of these vehicles on the environment is not yet well understood, there are strong indications that indiscriminate use can seriously damage both soils and vegetation. Their use in nondesignated areas often creates conflicts with people participating in other activities.

Appendix 8, *Fish*, and Appendix 17, *Wildlife*, consider the requirements for fishing and hunting. In 1970, requirements for the Region were estimated to be 75,562,000 angler days and 24,790,100 hunter days. Lands acquired for hunting and fishing also help to meet the total requirements for outdoor recreation.

2.2.6 Future Requirements in Recreation Days

The requirements for outdoor recreation in the Great Lakes Region were projected to the years 1980, 2000, and 2020. Annexes B and C in the back of this appendix explain these projections. Table 21–1 contains recreation-day requirements by planning subarea for each target year. Planning Subarea 2.2 (Lake Michigan Southwest) will continue to have the greatest recreation requirements. The greatest percentage increase is projected in Planning Subarea 4.1 (Lake Erie Northwest) and the smallest in Planning Subarea 1.2 (Lake Superior East).

Participation in individual recreational activities is projected to increase at different rates. The fastest growing activity for which Basinwide data are available is water-skiing, camping is second, while skiing shows the smallest gain of any of the activities considered.

Between 1970 and 1980 the requirements are expected to increase to 861 million recreation days, an increase of 35 percent. By the year 2000 the requirements are projected to increase to 1.298 million recreation days, an increase of 104 percent over 1970. The requirements are projected to be 1.863 million, an increase of 193 percent from 1970 to the year 2020 (Figure 21–33).

2.2.7 Resource Requirements

It is necessary to convert activity occasions to an acreage base to determine recreational resource requirements within the Great Lakes Region. This was accomplished by dividing the projected summer occasions (June, July, and August) for each outdoor recreation activity by the product of the number of design days, the turnover factor, and the design load per acre or mile for that activity. This procedure is explained in detail in Annex D, Calculation of Acreage Needs and Requirements. Table 21–4 summarizes the 1970–2020 acreage or mile requirements for each outdoor recreation activity within the Great Lakes Region. Annex I, Supplementary Statistical Tables, gives each activity's 1970–2020 acreage and mileage requirements by planning subarea.

2.3 Recreational Supply

The amount, distribution, and classification of existing and programmed recreational lands and facilities in the Great Lakes Region are considered in this section.

2.3.1 Recreational Resource Characteristics

The diversity of the Great Lakes Region provides excellent settings for outdoor recreation. This mixture includes the Great Lakes themselves, sandy beaches, hundreds of inland lakes and marshes, forest-covered uplands, and areas such as scenic streams, scenic highways, trails, recreational harbors, and historic sites.

2.3.1.1 The Great Lakes

The portion of the Great Lakes within the United States boundaries contains approximately 61,000 square miles (39 million acres) of water surface (Figure 21–34). But there are difficulties in using the Great Lakes for recreation. The water temperature, especially in the Upper Great Lakes, restricts body contact

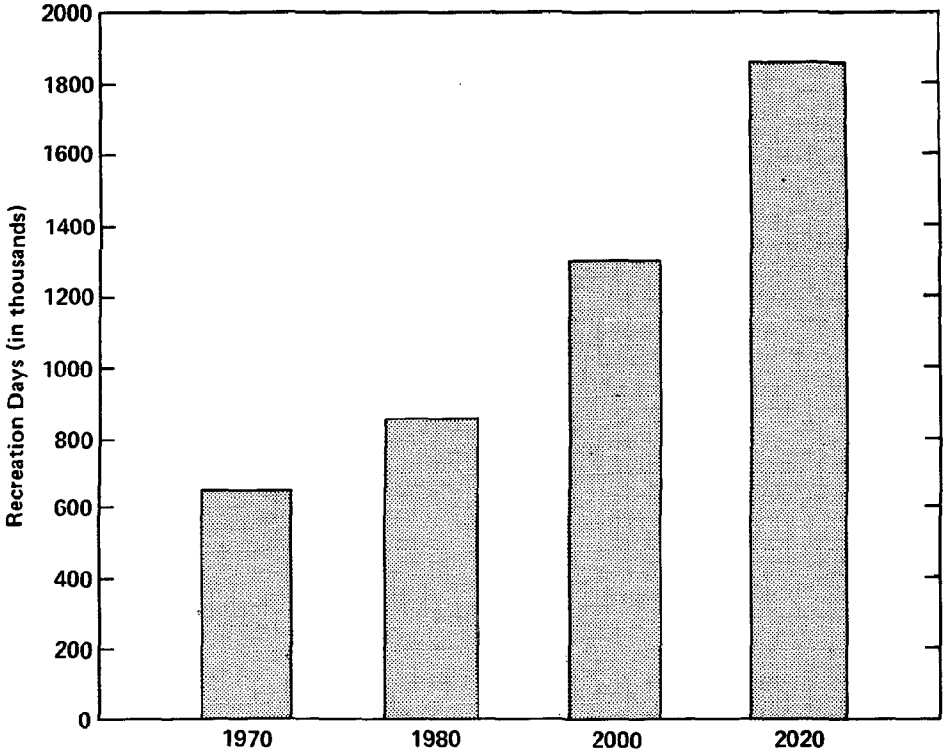


FIGURE 21–33 Annual Recreation Day Requirements of Great Lakes Region

TABLE 21–4 Summary of Annual Requirements in Acres or Miles by Activity, 1970–2020

Activity	Unit	1970	1980	2000	2020
Swimming	Acres	3,120	4,530	7,100	10,200
Picnicking	Acres	22,320	27,830	37,990	51,900
Camping	Acres	12,580	19,860	32,130	50,770
Hiking	Miles	4,820	7,680	12,030	17,570
Nature Trails	Miles	440	540	730	1,040
Boating	1000 Acres	1,043	1,525	2,413	3,648
Sailing	1000 Acres	50	71	113	168
Canoeing-Lakes	1000 Acres	42	63	97	138
Canoeing-Streams	Miles	4,350	7,200	11,305	16,140
Water Skiing	1000 Acres	291	507	925	1,515
Outdoor Games	Acres	61,240	90,330	152,870	231,360
Golfing	Acres	91,920	133,420	228,870	338,870
Bicycling	Miles	8,920	10,700	14,590	19,660
Horseback Riding	Miles	2,190	2,730	4,000	5,810
Skiing	Acres	8,030	8,640	10,870	13,710
Sledding	Acres	9,850	12,590	20,000	31,480
Ice Skating	Acres	770	1,220	1,960	3,140

Courtesy of Michigan Tourist Council

FIGURE 21–34 Great Lakes Shores. The Great Lakes are a valuable recreational resource, but their utility is diminished by cool water temperatures, lake storms, and lack of adequate access.

use for swimming and water-skiing. Lake Superior water temperatures are cold, ranging from 35°F to rarely more than 60°F during the warmest months.[64] Also, following stormy periods, cold winds from the northwest drive cool waters onto the off-wind shores. These waters are commonly too cool for comfortable swimming. Some beaches, especially those on Lakes Michigan and Huron, are subject to undertow conditions which temporarily preclude their use.

Size precludes the use of much of the Great Lakes by recreational watercraft. This restriction is intensified by unfavorable weather conditions and the lack of an adequate number of harbors of refuge. The Lakes are frequently rough and can become hazardous for small boats in short periods of time. Presently, there are 110 harbors where recreational boats can seek refuge and be moored. Except for the southern Lake Superior shore, these harbors are distributed fairly uniformly along the Great Lakes shoreline.

While there are presently more than 300 access sites on the Great Lakes, they are concentrated mainly in areas near large populations. Therefore, substantial portions of the Great Lakes shore in nonurban areas have very limited access available for public use. According to data presented in *Virginia Wildlife,* a person whose eye level is three feet above the water has a maximum range of visibility of two miles on the surface in clear weather. At seven feet he can see three miles.[68] Because of the limitations of access and the need for safety, this study assumes that only 50 percent of the water within two miles of shore, or 2.5 million acres, can be used for recreation.

2.3.1.2 Beaches

The findings of a study by the International Joint Commission on recreational beaches along the Great Lakes are summarized in Table 21–5. Annex I, Supplementary Statistical Tables, gives amount, ownership, and rec-

reation potential of Great Lakes beaches by planning subarea. Of the 5,543 acres of beaches in the Region, Planning Subarea 2.2 with 1,042 acres has the greatest amount, while Planning Subarea 5.3 with 12 acres has the least.

TABLE 21–5 Summary of Ownership and Availability to Public of Great Lakes Beaches

Great Lakes Beaches	Acres	Percent of Total
Publicly Owned Beaches		
Usable		
Open to Public	2,075	37.4
Restricted	107	1.9
Not Usable	116	2.1
Privately Owned Beaches		
Open to Public		
With Charge	121	2.2
Without Charge	92	1.7
Not Open to Public		
Potential for Development	1,479	26.7
Little or No Potential for Development	1,553	28.0
TOTAL	5,543	100.0

Forty percent of all beaches are publicly owned. Ninety percent of these are usable and open to the public (Figure 21–35). A small percentage of usable public beaches are not open to the general public.

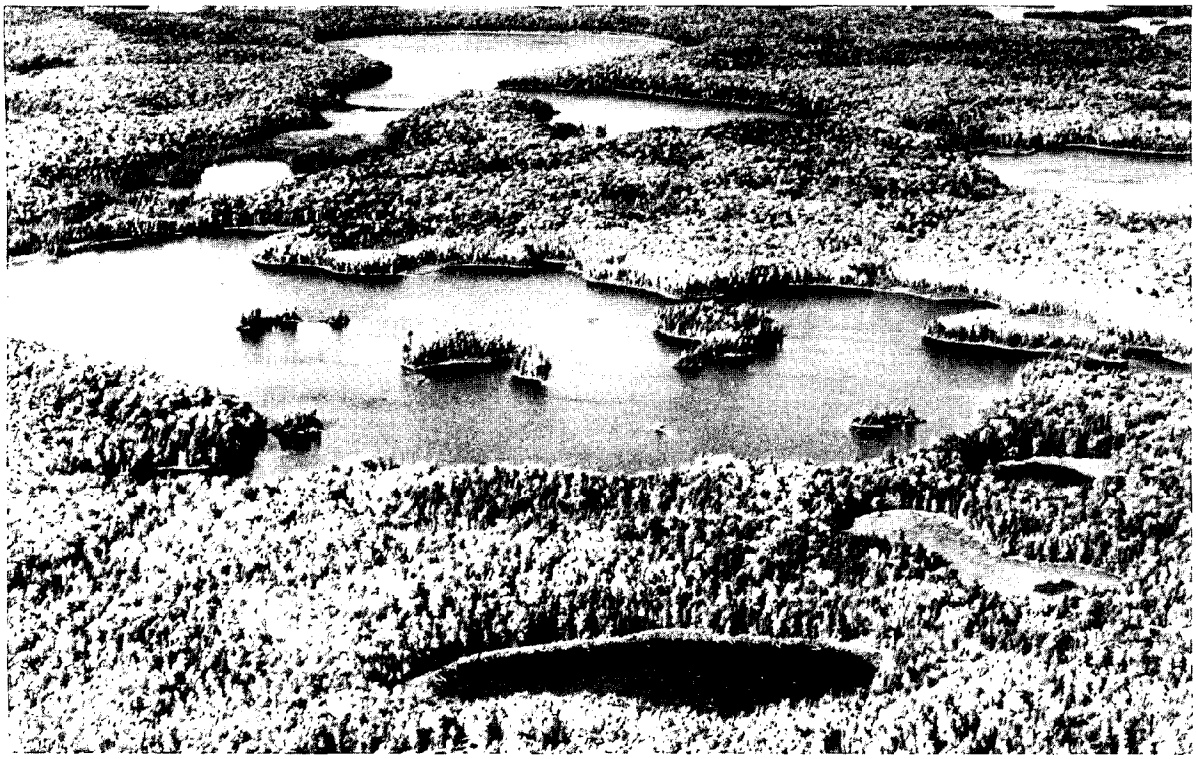
The largest acreage of restricted public beaches are found in Planning Subarea 2.2, where use of some Illinois township beaches is restricted to their residents. Only 10 percent of the private beaches are open to the public. Approximately 50 percent of those beaches not open to the public have some potential for development.

2.3.1.3 Inland Lakes

There are approximately 2.1 million acres of inland lakes within the Great Lakes Region (Figure 21–36). Because some lakes within the Region are very small, inaccessible, or very shallow, this study assumes that only 80 percent, or 1.7 million acres, of the total inland lake acreage has potential for recreational use. Of all planning units, Planning Subarea 1.1 has the most usable inland water acreage with 505.9 thousand acres, while Planning Subarea 4.4 has the least with 1.2 thousand acres.

Courtesy of Michigan Department of Natural Resources

FIGURE 21–35 Great Lakes Beaches. Forty percent of all beaches along the Great Lakes are publicly owned.



Courtesy of U.S. Forest Service

FIGURE 21–36 Inland Lakes in Sylvania Recreation Area. The inland lakes within the Great Lakes Region exceed two million acres, but most are located far from population concentrations.

2.3.1.4 Forests

Much of the northern half of the Great Lakes Region remains forested (Figure 21–37), and a substantial portion (12.7 million acres in 1970) is available for public use. This acreage equaled almost 90 percent of all recreational areas, excluding water, within the entire Basin. Public forests presently provide and will continue to provide substantial quantities of certain types of recreational opportunities. Because they are administered for many uses and are usually far from densely populated areas, they cannot meet a proportionate share of the Region's recreational requirements.

2.3.1.5 Special Areas

This category includes scenic streams and canoe trails, scenic highways, trails, recreational harbors and historic sites. Although these resources cannot be molded into a numerical demand-supply analysis, they are of importance for a balanced recreational program.

(1) Streams

The passage of Public Law 90–542 established the National Wild and Scenic Rivers System.[49] The Wolf River in Wisconsin (Figure 21–38), which lies within the Great Lakes Region, was specifically noted in the act. The lower portion of the Wolf was designated a component of the national system; the upper segment in Langlade County is identified under section 2(a)(ii) as a State River which might qualify for national status. The act also includes a list of potential additions in the Region including the Maumee in Ohio and Indiana and the Pere Marquette in Michigan, and procedures through which rivers may be added to the system.

Section 5(d) of the act states that the Secretaries of Interior and Agriculture "shall make specific studies and investigations to determine which additional wild, scenic, and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alterna-

tive uses of the water and related land resources involved." All or a portion of the following rivers within the Great Lakes Region are on the 5(d) list: AuSable, Manistee, and Pine Rivers in Michigan; and Flambeau, Pine, Popple, and Upper Wolf Rivers in Wisconsin.

Courtesy of Michigan Tourist Council

FIGURE 21-37 Northern Forests. Ninety percent of all recreation land within the Great Lakes Region is forest land.

These rivers appear to have natural values worthy of preservation. Designation on the 5(d) list does not preclude planning or construction programs to change existing uses in these river areas.

Certain States in the Great Lakes Region also have established a State scenic or natural river system. In northern Ohio, the Sandusky has been designated a scenic river. Wisconsin has established the Pine, Pike, Popple, Brule, and Flambeau Rivers as wild or scenic rivers. An act creating a natural river system has recently been passed in Michigan.

In addition to the designated wild or scenic streams, most States in the Great Lakes Region list a number of canoe trails. There are 537 miles of streams designated as canoe routes in Minnesota.[28] Of these, 296 miles in St. Louis County, 135 miles in Cook County, 86 miles in Lake County, and 20 miles in Carlton County lie within the Great Lakes Region. There are also many miles of lakes, especially in the Boundary Waters Canoe Area (BWCA) of the Superior National Forest, that provide excellent opportunities for wilderness canoeing. Within the Superior National Forest, canoeing and boating comprise twenty-one percent of all recreational activity exclusive of hunting and fishing. Within the BWCA itself, the percentage is undoubtedly greater. There are nearly 1000 miles of canoeable streams in that portion of Wisconsin within the Great Lakes Region.[64] The majority are in the northern part of the State. Among the more popular rivers are the Bois Brule, Bad, Marengo, Manitowich, Bear, Turtle, Peshtigo, and Little Fox.

Michigan has about 3,600 miles of canoeable rivers. Among the more important are the Black, Presque Isle, Ontonagon, Otter, Sturgeon, Paint, Michigamme, Brule, Menominee, Escanaba, Indiana, Manistique, Fox, Two Hearted, Tahquamenon, St. Marys, Carp, Pine, Black, Ocqueoc, Thunder Bay, Boardman, Betsie, Big Manistee, Big Sable, Pere Marquette, White, Little Muskegon, Muskegon, AuSable, Rifle, Tittabawassee, Chippewa, Cass, Maple, Grand, Thornapple, Kalamazoo, Paw Paw, St. Joseph, Huron and Raisin Rivers. A number of smaller streams are considered to be canoeable for shorter distances. Also several lake chains provide excellent opportunities for canoeing over substantial distances.[26]

Only one stream in the northern part of Indiana, the St. Joseph River, is classified as being canoeable for approximately 38 miles.[27] In Illinois, the Fox River provides oppor-

Courtesy of Wisconsin Department of Natural Resources.

FIGURE 21–38 Wolf River, Wisconsin. Many miles of free-flowing streams within the Great Lakes Region provide excellent opportunities for canoeing, fishing, and nature study.

tunities for canoeing. Nearly 500 miles of streams and rivers in northwestern Ohio, including the Maumee, Auglaize, Ottawa, Blanchard, St. Marys, and Sandusky Rivers are canoeable.[37] In northeastern Ohio, parts of the Cuyahoga, Chagrin, Grand, and Vermilion Rivers can be canoed during periods of good stream flow.

(2) Scenic Highways

Although the involvement of Federal agencies in a scenic highways program has diminished somewhat, State and local governments continue to examine existing roads for possible inclusion in a scenic highways system.

Wisconsin has been a leader in scenic easement legislation. Under the provisions of the Outdoor Recreation Act Program, the Wisconsin Highway Commission was authorized to acquire scenic easements on highways along Lake Michigan, Green Bay, and Lake Superior; along the Wisconsin, Fox, Milwaukee and Wolf Rivers; and in the lake and forest country of northern Wisconsin.[72]

A standing policy of the Minnesota Bureau of Public Roads specifies that, in highway design and location, full consideration be given to the impact of highways on recreation, aesthetics, and conservation.

The 1971 through 1977 *A Statewide Plan for Outdoor Recreation in Ohio* contains maps with scenic highways shown for several counties within the Lake Erie region.[37]

Michigan has many miles of marked, self-guiding scenic or forest drives in State and national forests. The *Michigan Outdoor Recreation Plan* also recognizes the value of coordination between the Departments of Natural Resources and Highways in the construction of scenic roads.[21]

Indiana's Highway Commission has prepared a proposed Scenic Highway Program that includes both parkways and scenic routes.

(3) Trails

The National Trails System Act (PL 90–543) designated three types of trails to be established in the United States.[50] National recreation trails (Figure 21–39) are to provide a variety of outdoor recreation uses in or reasonably near urban areas. National scenic trails are to be extended trails which provide maximum outdoor recreation opportunities while preserving nationally significant scenic, historic, natural, or cultural qualities along their route. Connecting or side trails are to provide public access to or connections between national recreation trails and national scenic trails.

Two trails within the Great Lakes Region have recently been designated as national recreation trails. The Illinois Prairie Path,

Courtesy of Michigan Tourist Council

FIGURE 21–39 Trails. Federal, State, and local trails within the Great Lakes Region provide opportunities for hiking, cycling, horseback riding, and nature study.

12.5 miles long, on the abandoned Chicago, Aurora, and Elgin Electric Railway right-of-way through Kane, Cook, and DuPage Counties, is used by hikers, bicyclists, and horseback riders. The Ice Age Glacial Trail, which has only a portion of its 25 miles within the Great Lakes Region, is used by hikers, bicyclists, and snowmobile enthusiasts.

The U. S. Forest Service has established 650 miles of trails for such uses as hiking, cycling, snowmobiling, and canoeing within the seven national forests, including the Sylvania Recreation Area, Michigan, and the Boundary Waters Canoe Area, Minnesota, located in the Great Lakes Region.

Many of the States within the Basin have also established their own trail system. A portion of Ohio's Buckeye Trail is found within the Lake Erie watershed. This hiking trail was designated the official State trail by the Ohio Assembly in 1967. It serves the Cleveland-Akron area and will tie in with the proposed North Country Trail. Several bicycle trails have also been developed in Ohio. The Maumee Valley Bikeway includes three round-trip tours totaling more than 20 miles.

The major hiking trail in Michigan is the Shore to Shore Trail, which runs 225 miles east and west between Tawas and Empire. This trail is also used for horseback riding and snowmobiling. Bicycling trails are found on Belle Isle, an island offshore from Detroit, and on Mackinac Island. Interpretive nature trails are found in the Huron-Clinton Metropolitan Parks. Other major trails are located within State forests. A trail through Michigan from Midland to Mackinac City is under construction. Another planned hiking and horseback riding trail is the Gitchee-Gaumie Trail from Grand Portage, Minnesota, along the southern Lake Superior shore to Sault Ste. Marie, Michigan. There are approximately 4000 miles of snowmobile trails in Michigan.[21] Some of these, however, are on national forest land.

Approximately 40 percent of Wisconsin's forest trails are located within the State's northern forests, many of which are in the Great Lakes Region. Many of Wisconsin's 7000 miles of snowmobile trails are also within the Region. Metropolitan Milwaukee has developed 130 miles of bicycle trails on park roads and little-used secondary roads through Milwaukee and Waukesha Counties. Also included is a 64-mile bicycle route that circles the city. An equivalent mileage has been developed in the Kettle area west of the city.[7]

In Illinois the Cook County Forest Preserve and the Chicago Park District have many miles of hiking, horseback, and bicycling trails. The 90-mile towpath of the Illinois-Michigan Canal from Chicago to LaSalle is suitable for hiking and could be improved to include bicycle and horseback trails. The

proposed Green Bay Trail would be located on an abandoned railroad right-of-way along Lake Michigan between Chicago and Milwaukee.

Minnesota had 1,104 miles of horseback riding trails and 3,128 miles of snowmobile trails in 1967. Eighty-eight percent of all horseback trails and 76 percent of all snowmobile trails were on public land, largely in State forests or State parks. The four counties of Minnesota within the Great Lakes Region had 19 percent (219 miles) of all horseback trails and 44 percent (1,376 miles) of all snowmobile trails in the State. In 1967 there were approximately 1,500 miles of hiking trails in Minnesota, most of them in Region 3 which lies largely in the Great Lakes Region. Ninety percent of the trails were publicly owned and 58 percent were State owned.

A 1969 inventory of Statewide outdoor recreation in Indiana indicated that those counties which lie within the Great Lakes Region contained 107 miles of foot trail, 6 miles of bicycle trail, 75 miles of horse trail, and 23 miles of snowmobile trail.

(4) Recreational Harbors and Access Sites

The 110 recreational harbors on the Great Lakes shores provide more than 15,000 berths for recreational boats.[11] These harbors are generally well distributed throughout the Lake basins, but some planning subareas have only limited harbor facilities. Lake Superior East, Planning Subarea 1.2, has only two harbors for more than 500 miles of shoreline. Western Lake Erie has seven harbors on its 150 miles of shoreline.

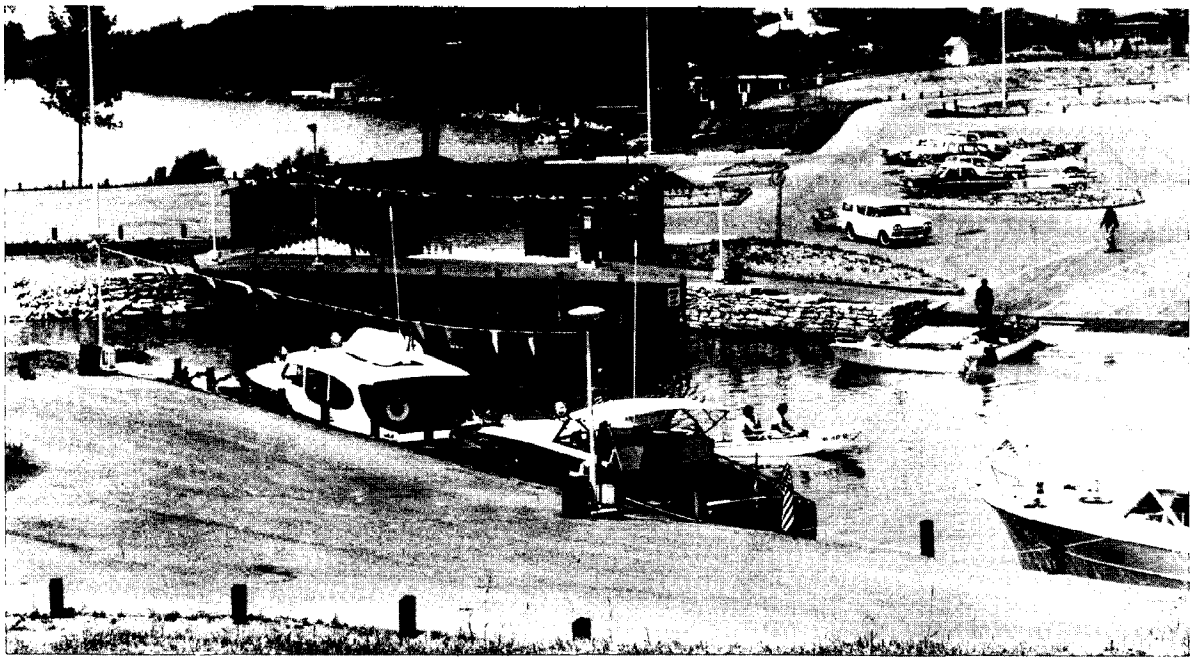
There are nearly 2,500 water access sites on the Great Lakes, inland lakes, and streams in the Great Lakes Region (Figure 21–40). The number within planning subareas varied from 20 in western Lake Ontario, Planning Subarea 5.1, to 743 in northwestern Lake Michigan, Planning Subarea 2.1. More than 1,500 of all sites are located in the Lake Michigan region.

Appendix R9, *Recreational Boating*, provides a complete analysis of recreational boating in the Great Lakes Region.

(5) Historic Sites

Historic sites in the Great Lakes Region include old military forts, archaeological sites, old homes and other buildings, battlefields, early mines, and canals and locks. At present, a full inventory is not available for the entire Region, although it would be highly desirable.

Fourteen historic sites have been identified in the Minnesota part of the Region. Hull-



Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–40 Marina. Marinas such as this provide public access to the Great Lakes and a place of refuge during lake storms.

Rust-Mahoning Mine and Soudan Mine are National Historic Landmarks. Only 200 of the 1,100 known archaeological sites in the State have been explored.[28] Sixty-six historical markers and 55 historical sites and museums are located in the Wisconsin part of the Great Lakes Region.[71]

The Ohio Historical Society has identified 259 landmarks which conform to stated criteria. Forty-two are registered National Historic Landmarks and historic places. A significant number of these lie within the Great Lakes Region.[37]

The Michigan Historical Commission, established in 1913, has a historical site register containing more than 400 historical sites and buildings and an additional 250 sites identified with official State historical markers. Approximately 300 centennial farms have also been designated. Six of Michigan's State parks have been established primarily to preserve historical values. The Mackinac Island State Park Commission, created in 1895, controls Fort Mackinac and Fort Michilimackinac. Substantial parts of both of these old forts have been reconstructed. As of December 1970, 33 of Michigan's historic sites were listed in the National Register of Historic Sites.[23]

Three of Indiana's 11 historic places listed in the National Register are within the Great Lakes Region. They are the Joseph Bailly Homestead in Porter County, and Gene Stratton Porter's home, Timberlost, and his cabin in Noble County.[15] Illinois, New York, and Pennsylvania also have a significant number of historic places within the Great Lakes Region. Some of these historic places are still privately owned. There is a need to assure their perpetual preservation and maintenance.

(6) Seasonal Homes

The thousands of cottages and seasonal and permanent homes located on inland lakes and streams and the Great Lakes shores permit many people to participate in certain recreational activities without using either public or commercial facilities. The activity receiving the greatest impact from this source is swimming. Since all inland water and those Great Lakes waters within two miles of the shoreline were used in calculating usable water surface, the water surface available for boating and water-skiing has already been included. By definition, picnicking, camping, and hiking are considered to take place away from home. The only other activity for which these homes may provide some supply is ice skating.

2.3.2 Amount, Distribution, and Classification of Recreational Resources

Information on the amount, distribution, and classification of recreational resources and opportunities available within the Great Lakes Region was obtained largely from the inventory data of the 1964 Nationwide Plan for Outdoor Recreation, prepared by the Bureau of Outdoor Recreation, and a 1969 update of this inventory by the States in the Region. Information on private recreation enterprises was also gathered from inventories by the National Association of Soil and Water Conservation Districts.

Because of the constraints on research within a Comprehensive Type I (Level A) River Basin Study, the data in this section have the following limitations:

(1) No information was available on the amount of existing recreational lands used for sightseeing, driving for pleasure, walking for pleasure, attending outdoor games, and attending outdoor concerts.

(2) Information on the recreational opportunities provided by local government was inadequate.

(3) Data on private recreational opportunities were incomplete in many of the States in the Region.

(4) Some States did not provide fully updated supply information, so other, less accurate inventory data had to be used.

(5) The inclusion of water acreages in the supply base was somewhat arbitrary.

It was assumed that 80 percent of all inland water surface and 50 percent of the Great Lakes water surface within two miles of the shoreline are available for recreation.

The land and water surface acres usable for recreation in 1970 is given by planning subareas in Table 21–6. There are some areas in the Region which have surpluses of recreational lands while other areas have severe shortages. For example, Planning Subarea 1.1, 1.2, and 2.4 (Lake Superior West, Lake Superior East, and Lake Michigan Northeast) have 69.4 percent of all land available for recreation within the entire Region. These planning subareas, however, have only 5.2 percent of the total current Regional requirement. (Table 21–7). On the other hand, Planning Subareas 2.2, 4.1, and 4.3 (Lake Michigan Southwest, Lake Erie Northwest, and Lake Erie Central), containing the metropolitan areas of Chicago, Detroit, and Cleveland, have 49.2 percent of the Region's requirements, but only 1.9 percent of available recreational land.

TABLE 21–6 Land and Water Surface Usable for Recreation in the Great Lakes Region, 1970 (in thousands of acres)

Planning Subarea	Land	Great Lakes	Inland Lakes	Total
1.1	4,726.2	325.0	506.0	5,557.2
1.2	2,519.0	481.0	116.0	3,116.0
2.1	1,594.9	245.0	251.0	2,090.9
2.2	125.5	124.0	69.0	318.5
2.3	83.9	69.0	106.0	258.9
2.4	2,468.8	451.0	228.0	3,147.8
3.1	1,690.7	178.0	111.0	1,979.7
3.2	11.3	137.0	24.0	172.3
4.1	75.1	151.0	40.0	266.1
4.2	30.2	59.0	26.0	115.2
4.3	73.8	69.0	15.0	157.8
4.4	130.4	96.0	1.0	227.4
5.1	83.7	38.0	10.0	131.7
5.2	160.5	51.0	170.0	381.5
5.3	217.3	77.0	32.0	326.3
TOTAL	13,991.3	2,551.0	1,705.0	18,247.3

TABLE 21–7 Distribution of Recreation Requirements and Supply by Planning Subarea, 1970

Planning Subarea	Percent of Acreage Requirements	Percent of Supply Based on Available Acres of Land	Percent of Supply Acres of Land and Water
1.1	1.6	33.8	30.5
1.2	.7	18.0	17.1
2.1	6.0	11.4	11.5
2.2	26.7	.9	1.7
2.3	11.3	.6	1.4
2.4	2.9	17.6	17.3
3.1	1.2	12.1	10.8
3.2	4.9	.1	.9
4.1	13.3	.5	1.5
4.2	7.2	.2	.6
4.3	9.2	.5	.9
4.4	4.4	.9	1.2
5.1	3.4	.6	.7
5.2	5.8	1.2	2.1
5.3	1.4	1.6	1.8
	100.0	100.0	100.0

The distribution of water surface considered usable for small watercraft shows a similar disparity between location of resources and needs of the people. Table 21–8 indicates that the Region's five northern planning subareas, 1.1, 1.2, 2.1, 2.4, and 3.1, contain 71 percent of all inland water surface and 68 percent of all water surface considered usable for recreation, but have only 13 percent of all the water-surface oriented recreational requirements. At the same time, Planning Subareas 2.2, 4.1, 4.2, and 4.3, containing the cities of Chicago, Detroit, Toledo, and Cleveland, have 56 percent of the Region's water-surface oriented recreational requirements, but only 8.8 percent of its inland water surface and 13.0 percent of its total usable water surface.

The shortage of recreational resources within the highly populated planning subareas is further compounded by the distance between population centers and existing recreational resources. Detroiters must travel approximately 150 to 200 miles to reach the southern edge of Michigan's major forested areas. Chicagoans must travel 200 miles or more to reach the central and northern parts of Wisconsin. Clevelanders must travel south more than 100 miles to reach the scenic southeastern Ohio area. The vast majority of the people of the Great Lakes Region live substantial distances from the primary recreation resource areas.

The supply of publicly designated recreational land in the Region, which is somewhat less than all land and water available for recreation, represents many land types under various management. Table 21–9 sets forth the actual and percentage supply of public forests, Indian lands, hunting and wildlife refuges, national parks, national lakeshores, and State, county, and local parks within the Region. Approximately 89 percent of all public land within the Region is forest land. Most of the forest lands and wildlife refuges and all of the Indian lands have only limited development for recreational uses other than hunting and fishing.

The public recreational land within the Region represents all six land classes of the ORRRC Classification System: Class I, high density recreation areas; Class II, general outdoor recreation areas; Class III, natural environment areas; Class IV, outstanding natural areas; Class V, primitive areas; and Class VI, historic and cultural sites. Figure 21–41 illustrates the number of acres in each

TABLE 21–8 Distribution of Water-Surface Oriented Recreation Requirements and Recreation Water Resources Within the Great Lakes Region

Planning Subarea	Percentage of Total Water-Surface Oriented Requirements	Percentage of Inland Water Surface	Percentage of Water-Surface within the Great Lakes Region
1.1	2.0	29.6	19.5
1.2	.7	6.8	14.0
2.1	5.9	14.7	11.7
2.2	26.8	4.0	4.5
2.3	12.1	6.2	4.1
2.4	3.1	13.3	15.9
3.1	1.2	6.5	6.8
3.2	4.8	1.4	3.8
4.1	13.0	2.3	4.5
4.2	7.0	1.5	2.0
4.3	9.0	.9	2.0
4.4	4.2	.1	2.2
5.1	3.6	.6	1.1
5.2	5.4	10.3	5.3
5.3	1.2	1.8	2.6
	100.0	100.0	100.0

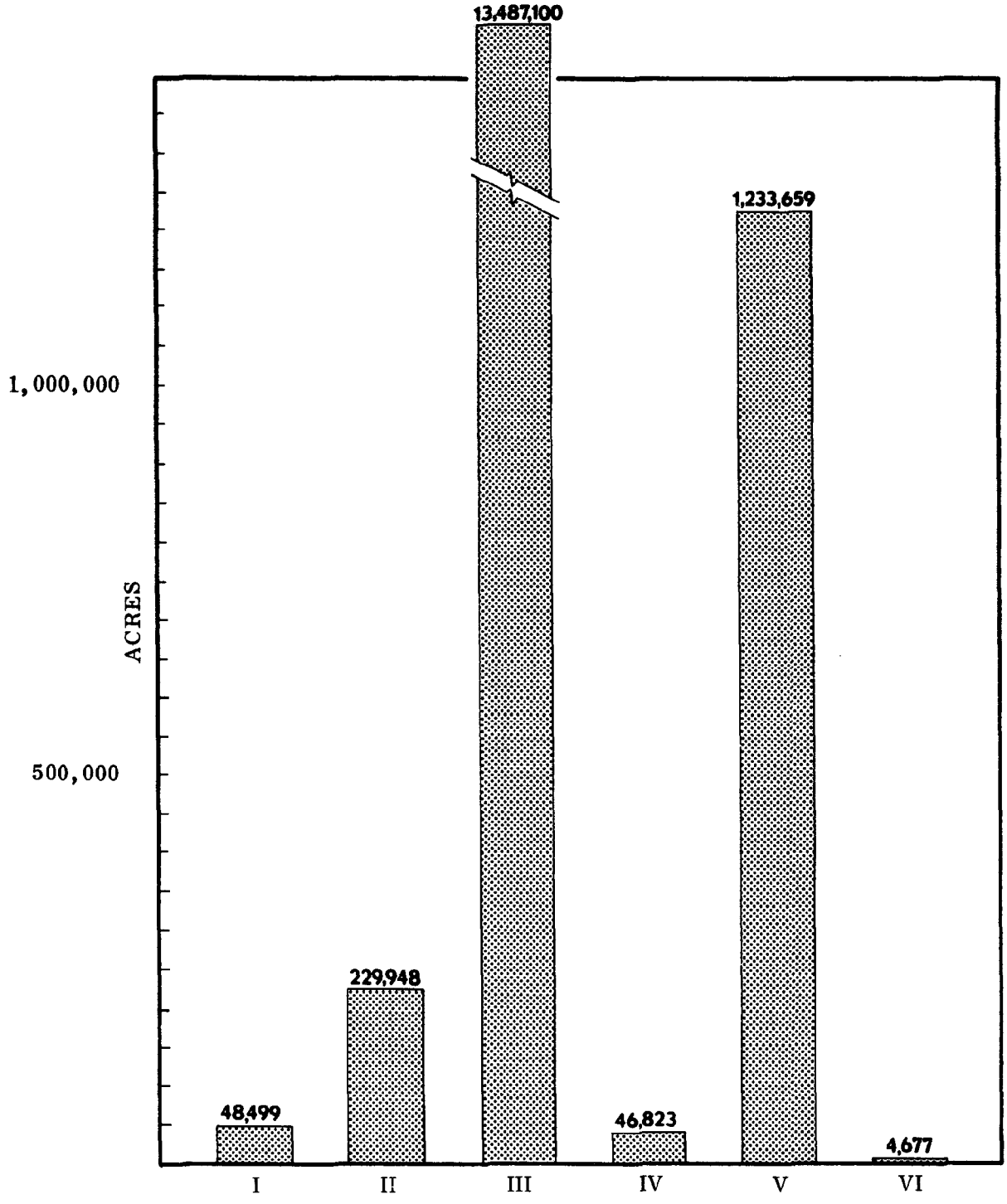


FIGURE 21–41 Classification of Public Outdoor Recreation Land within the Great Lakes Region, 1970 (ORRRC Classification System)

TABLE 21–9 Acres of Public Recreational Land in the Great Lakes Region, 1970

Land Type	Acres (1000)	Percent of Total
Public Forests	12,900	88.9
Indian Lands	177	1.2
Hunting & Wildlife Refuges	589	4.1
National Parks	134	.9
National Lakeshores	162	1.1
State, County, & Local Parks	554	3.8
Total	14,516	100.0

land class. Since forest lands are generally classified as natural environment areas, Class III lands comprise 89 percent of all recreation lands in the Region. Class I lands make up 3.7 percent of the total; Class II lands, 1.5 percent; Class IV lands, 3 percent; Class V lands, 8.2 percent; and Class VI lands, .03 percent. Table 21–85 (Annex I) gives the classification of existing recreational lands by planning subarea.

Because Class I and Class II lands are quite intensively developed for recreation, they provide most of the opportunities for the recreational activities considered in this study. Thirty to seventy percent of the total land surface of Class I lands is developed for recreation, with an average development of 50 percent. The development on Class II lands averages 15 percent, with a range of development from 5 to 30 percent.

2.3.3 Supply in Recreation Days: 1970

Annex I, Supplementary Statistical Tables, contains a breakdown of the 1970 recreation-day supply by activity for each planning subarea. The Region today provides 228,983,000 recreation days. Of this total, outdoor game opportunities supply 31 percent; boating, 27 percent; picnicking, 14 percent; swimming, 12 percent; and the remaining activities, 16 percent.

2.3.4 Supply in Recreation Days: 1980

The 1980 regional supply in recreation days represents the development known to be programmed for the 1970s by the various agencies providing recreational opportunities within the Region. Based on this premise, a total 1980 supply of 236,318,000 recreation days is projected for the Region. Annex I contains the projected recreation-day supply for each activity in each planning subarea. Outdoor games, followed in order by boating, picnicking, and swimming, will continue to supply the most numerous recreation-day opportunities.

2.4 Recreational Needs

Recreational need is defined as the difference between the existing recreational supply and the total recreational requirement. In this report recreational need is stated for the target years in the following ways: in recreation days for the target years by planning subarea, in recreation days for the target years by activity, and in acres or miles of developed land for the target years by activity for each planning subarea.

Needs for 1970 were derived by subtracting the 1970 supply of recreation days or acres by activity from the 1970 requirement for these activities. Future needs were projected by subtracting the projected 1980 supply base in recreation days or acres by activity from 1980, 2000, and 2020 requirements for these activities. Where data were not available to project the supply base to 1980, the 1970 supply base was used.

2.4.1 Present Needs in Recreation Days and Acres or Miles

Table 21–10 provides a summary of recreation-day needs by planning subarea within the Region. Table 21–11 gives the 1970 recreation-day needs by activity. Of the total need of 113.8 million recreation days, 55.0 million, or 48.3 percent, were for outdoor games.

Table 21–12 gives the 1970 recreational needs in developed acres, miles, and acres of water surface by activity. In this table, boating includes sailing, canoeing, and waterskiing. Outdoor games had the greatest acreage need in 1970, followed closely by golf.

This table indicates a 1970 acreage surplus of water surface, campgrounds, and ice skating facilities within the Great Lakes Region. However, these surpluses generally occur on paper only. Surpluses of water surface in planning subareas with low population densities and low recreational requirements overshadow the actual need for additional water surface in heavily populated planning subareas. Surpluses of camping facilities in several of the planning subareas in Minne-

TABLE 21–10 Summary of Needs by Planning Subarea in Thousands of Recreation Days

Planning Subarea	1970	1980	2000	2020
1.1	1,122	1,957	3,880	6,087
1.2	1,248	1,809	2,400	3,412
2.1	9,730	13,881	26,939	46,955
2.2	30,815	62,554	132,322	225,521
2.3	18,625	34,639	69,694	113,001
2.4	3,348	5,768	9,375	15,962
3.1	3,092	3,146	5,814	9,159
3.2	10,461	16,294	29,457	44,419
4.1	21,838	37,380	75,198	122,635
4.2	6,022	14,190	32,733	58,226
4.3	8,751	17,504	41,504	71,087
4.4	6,483	11,857	22,002	38,195
5.1	4,559	7,200	13,182	21,070
5.2	10,060	15,900	28,393	45,100
5.3	2,755	4,005	6,355	9,489
TOTAL*	138,909	248,084	499,248	830,318

* The total needs given here for each target year are greater than those shown in Table 21-11. This has occurred because in Table 21-11 surpluses of an activity in one subarea were allowed to offset needs for that activity in another subarea. This was not done on the table above, for surpluses of one activity cannot meet deficits in another activity in a planning subarea.

sota, Wisconsin, northern Michigan and New York conceal shortages near urban areas.

A portion of the indicated surpluses also results from the inability of this study's methodology to properly consider directional patterns of travel. The methodology assumed that recreational requirements radiate equally in all directions from population centers; this generally is not the case for urban areas within the Region. For example, a greater portion of the recreationists of Chicago and Milwaukee travel northward within the Region than travel southward or westward out of the Region.

2.4.2 Future Needs in Recreation Days and Acres or Miles

The 1980, 2000, and 2020 needs in recreation days for outdoor recreation within the Great Lakes Region are given in Table 21–11. The total need is 219.1 million recreation days in 1980, 454.7 million in 2000, and 784.6 in 2020, with the need for outdoor games accounting for approximately half of the total need.

Table 21–12 gives 1980, 2000, and 2020 recreation needs in developed acres, miles, and acres of water surface by activity. Surplus water surface is shown through 2000, but this surplus is believed to be only on paper. Beginning in 1980, golf will surpass outdoor games as the activity requiring the most additional acreage. The relationship between requirements and needs for the Region as a whole is shown in Figure 21–42.

2.4.3 Distribution of Recreation Need

The percentage distribution of 1970 recreation needs in land acres, land miles, and

TABLE 21-11 Summary of Needs by Activity (in millions of recreation days)

Activity	1970	1980	2000	2020
Land-Based Water-Oriented				
Beach Swimming	8.0	21.5	51.3	86.9
Picnicking	7.3	15.4	33.5	58.1
Camping	-.2*	3.9	12.1	24.4
Hiking and Nature Trails	11.2	15.8	23.3	33.7
Land-Based General				
Outdoor Games	55.0	118.6	242.5	398.5
Golf	3.9	9.1	22.8	38.2
Bicycling on Public Lands	14.3	17.3	23.8	32.8
Horseback Riding on Public Lands	1.2	1.6	2.8	4.6
Water Surface (Boating, Sailing, Canoeing, and Water Skiing)	-33.0	-18.1	8.5***	46.4
Winter Sports				
Skiing	1.7	1.7	2.4	3.2
Sledding	11.2	14.2	22.8	35.7
Ice Skating	-5.9	-.5	8.9	22.1
TOTAL	113.8**	219.1	454.7	784.6

*Indicates surpluses

**This total does not include surpluses since surpluses in one activity cannot offset deficits in another activity.

***The seeming contradiction between the 8.5 million recreation-day need for water surface and the 708 thousand acre surplus shown for the same time frame in Table 21-12 does not exist. The northern planning subareas within the Great Lakes Region have vast surpluses of water surface, while the southern planning subareas have severe shortages. Considering the Region as a whole, the northern surpluses overshadow the southern needs, and an acreage surplus exists. However, the methodology used in this appendix assumes a more intensive recreational use of water in the southern part of the Region than in the northern part. (This means that an acre of water in the southern planning subareas provides more recreation days than does an acre in northern planning subareas.) Thus when the conversion is made to recreation days, the southern part of the Region overshadows the northern part, and a recreation-day deficit for the entire Region results.

TABLE 21-12 Summary of Needs in Developed Acres or Miles by Activity

Activity	Units	1970	1980	2000	2020
Land Based					
Water-Oriented					
Swimming	Acres	830	2,010	4,640	7,850
Picnicking	Acres	4,290	8,950	18,930	33,180
Camping	Acres	-1,720*	4,100	16,310	35,060
Hiking and Nature Trails	Miles	3,170	5,680	10,150	15,880
Land Based Activities					
Outdoor Games	Acres	30,290	59,080	121,210	199,360
Golf	Acres	24,190	59,670	150,670	256,740
Bicycling	Miles	8,690	10,530	14,420	19,490
Horseback Riding	Miles	1,550	2,020	3,470	5,520
Winter Sports					
Skiing	Acres	5,720	5,190	8,330	11,160
Sledding	Acres	10,310	12,980	20,630	32,490
Ice Skating	Acres	-370	60	860	1,900
TOTAL	Acres	76,350**	152,040	341,580	577,740
	Miles	13,410	18,230	28,040	40,890
Water Surface					
Boating	Acres	-2,829,000	-2,093,000	-708,000	1,212,000

* Indicates surpluses

** This total does not include surpluses since surpluses in one activity cannot offset deficits in another activity.

water-surface acres is given in Table 21-13. Planning Subareas 2.2, 2.3, and 4.1 have more than 50 percent of the Region's needs for both land acres and miles of trail. The Region's entire 1970 needs for additional water surface are located in Planning Subareas 2.2 and 4.3. This distribution of needs indicates that recreational development should be concentrated near the Chicago, Detroit, and Cleveland urban areas.

Annex I, Supplementary Statistical Tables, gives the acre or mile needs for each outdoor recreation activity by planning subarea for the years 1970, 1980, 2000, and 2020. By the year 2020, more than 550,000 acres of land, 40,000 miles of trail, and 2,500,000 acres of water surface will be needed to meet the recreation requirements of the Region's planning subareas.

A large portion of the total requirement is generated by urban people on one-day trips and should be satisfied within 50 miles of the major SMSAs. However, the basic question of surface water availability relates more to location than to gross quantity. Generally, the planning subareas with the greatest recreational requirements also have the greatest shortages of surface water. For example, the Lake Superior region has a surplus of surface water, but these waters are not within easy reach of large population centers.

Additional information on specific needs for individual planning subareas is included in Section 4 of this report.

TABLE 21–13 Percentage Distribution of 1970 Recreational Needs by Planning Subarea

Planning Subarea	Land Acres	Miles	Water Surface Acres
1.1	1.4	.8	0
1.2	1.5	.5	0
2.1	9.0	7.3	0
2.2	23.2	27.4	83.8
2.3	13.9	12.0	0
2.4	4.4	3.1	0
3.1	2.3	.9	0
3.2	7.7	4.6	0
4.1	17.7	12.2	0
4.2	2.2	6.6	0
4.3	3.3	8.9	16.2
4.4	4.1	4.4	0
5.1	2.3	3.1	0
5.2	4.5	6.2	0
5.3	2.5	2.0	0
TOTAL	100.0	100.0	100.0

2.4.4 Classification of Recreation Need

A combination of factors indicates that much of the land acquired for recreation near large urban areas should be intensively developed (Class I). The need for additional recreational opportunities is greatest near population concentrations, and properly developed areas can withstand heavy sustained use. Because lands with recreational potential are relatively scarce near large cities and are generally very expensive, the optimum use should be made of existing recreation lands. Highly developed areas bring the most numerous recreational opportunities per unit of cost. There also is a need to preserve unique areas, high quality natural areas, and other open space lands in and near urban areas to provide a well-rounded mix of recreational opportunities to the urban populace.

Recreational areas that are farther from cities should be less intensively developed (Class II). Class II lands ideally have a varied topography, interesting flora and fauna, and

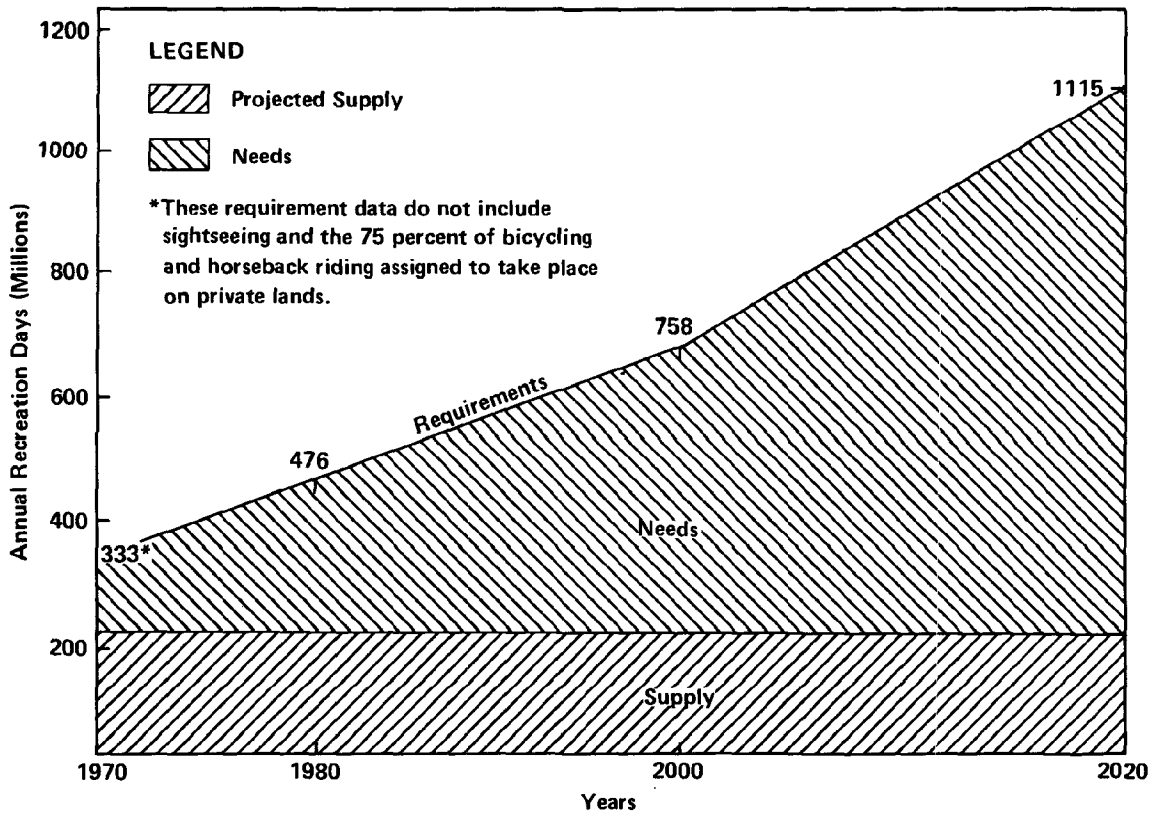


FIGURE 21–42 Estimated Requirements and Needs in Recreation Days, Great Lakes Region

generally attractive natural or man-made settings. These areas should be developed to provide a wide range of recreational opportunities.

Table 21–14 gives both the Class I and Class II land needs, and the total land and water needs in acres for outdoor recreation within the Region for the target years 1970–2020. Annex E, Computation of Class I and Class II Land Needs, describes the method used to derive data on needs by recreation land class. Annex I contains Class I and Class II land needs and total land and water needs for the target years by planning subarea.

TABLE 21–14 Summary of Needs for Recreation Land and Water by Recreation Land Class (in thousands of acres)

	1970	1980	2000	2020
Class I Land	87	162	349	567
Class II Land	157	275	544	934
Total Land	244	437	893	1,501
Water	142	540	1,414	2,921
TOTAL	386	977	2,307	4,422

Section 3

TOURISM

Tourism has considerable impact on both the economy and the recreational resources of the Great Lakes Region. Forested terrain, inland lakes, streams, and the Great Lakes make the Region especially appealing as a vacation land for millions of people every year. In the future, the importance of tourism is expected to increase as a function of expanding population, higher disposable incomes, more vacation time, and increased mobility. The number of tourists, their origins and destinations, their expenditures, and the number of summer homes have been used in recent years to measure the significance of tourism in specific areas in and adjacent to the Great Lakes Region.

3.1 Tourist Visitations

A Bureau of Outdoor Recreation study of water-oriented outdoor recreation in the Lake Superior basin[64] indicated that an estimated 1.4 million tourists came to that area in 1964 (Figure 21-42). Similar Bureau of Outdoor Recreation reports on the Lake Huron[61] and Lake Ontario basins[63] stated that vacationists in the two basins numbered approximately 1.8 million and 2.25 million, respectively, in 1967. Similar statistics for the Lake Michigan and Lake Erie basins are not available. Table 21-15 indicates tourist visitation for the Lakes Superior, Huron, and Ontario basins.

Studies reported in references 69, 3, 24, and 34 also indicated that the typical tourist of the Great Lakes Region resided either in the State in which he vacationed or in one of the neighboring States. The typical tourist drove the family car on his vacation trip, liked to view scenery, preferred to follow shoreline highways on circle tours of the Great Lakes, made his vacation visit in June, July, or August, and preferred motel accommodations in his travel although camping was gaining in popularity.

3.2 Tourist Expenditures

Bureau of Outdoor Recreation studies have also stated that an estimated 50 million dollars were spent by tourists in the Lake Superior basin in 1964,[64] 63 million in the Lake Huron basin in 1967,[61] and 142 million in the Lake Ontario basin in 1967.[63] Tourist expenditures in the Lake Michigan and Lake Erie basins have not been estimated. Table 21-16 indicates tourist expenditures for the Lakes Superior, Huron, and Ontario basins.

Other studies provide more specific information with respect to tourist expenditures. One report[4] indicated a daily per capita tourist expenditure of $9 in 1967 and estimated an increase to $15 by 1977. The report stated that existing facilities are to a large extent underfinanced and obsolete, that low-spending tourists are the norm rather than the excep-

TABLE 21-15 Summary of the Estimated Tourist Visitation and Expenditures in the Great Lakes Region

Basin	Year	Visitation (Millions)	Expenditures (Millions of Dollars)
Superior	1964	1.4	50
Michigan		(No available data)	
Huron	1967	1.8	63
Erie		(No available data)	
Ontario	1967	2.2	142

TABLE 21-16 Amount of Expenditures for 1960 Recreation Travel in the Lake Ontario Basin

Source of Recreation Expenditures	Group Size (thousands)	Percent of Dollar Sales	Amount of Expenditures (millions of dollars)
Permanent Residents	1,981	38	104
Summer Residents	225	10	27
Vacationers	2,251	52	142*
TOTAL	4,457	100	273

*Obtained as follows: 2-1/4 million times $63 (average amount vacationer spends on vacation) equals $142 million. The other two figures in the last column are based as a proportion to the 52:142 ratio.

tion, and that this tends to suppress wages.

A 1965 New York Department of Commerce study indicated that vacationists, spending an average of 6.4 days in the Lake Ontario basin, averaged $63 per person in expenditures. A year earlier, a Michigan State Highway Department study[24] reported an average trip cost for tourist parties in Michigan of $116 and an average expenditure per day approaching $25, or $7 per person.

3.3 Summer Homes

Information on summer or vacation homes within the Great Lakes Region is somewhat limited. A few studies in recent years, however, have attempted to estimate the number of such dwellings in various portions of the Region.

In 1961, Dr. I. V. Fine[8] indicated there were more than 25,000 summer residences within the Lake Michigan watershed of Wisconsin. By 1965, it was estimated that the entire Lake Michigan basin was the location for 70,000 to 80,000 summer homes.

The Lake Huron basin was estimated to have approximately 44,000 seasonal vacation homes in 1969. Iosco County had more than 3,200 seasonal homes, while Cheboygan, Clare, Huron, Montmorency, and Ogemaw Counties had more than 2,000 vacation homes each.

In 1960, the Lake Ontario basin had approximately 37,500 seasonal vacation homes. Counties directly adjacent to Lake Ontario were experiencing the greatest concentrations, with Jefferson County having 5,600 seasonal homes and St. Lawrence, Wayne, Oswego, and Cayuga Counties each having more than 2,000 seasonal homes.

The impact of summer residents cannot be overlooked in outdoor recreation planning. They perhaps account for 10 percent or more of the dollar sales in the Basin, as indicated in Table 21-16, and are responsible for visual chaos and environmental disturbances to many of our most important recreational resources. Unplanned subdivisions surrounding Shawano, Loon, and Kelly Lakes, Wisconsin, and Houghton Lake, Michigan, are examples where unsewered cottages are two and three rows deep, and the wilderness values sought by the early cottage dwellers have disappeared.

3.4 Tourist Use of Outdoor Recreation Resources

Interest in sightseeing and water-dependent activities, such as swimming, boating, canoeing, and fishing, were considered in one study[33] to be the most popular outdoor activities of tourists in Michigan. Such popularity has created overcrowded conditions on many of our lakes and streams during the summer months (Figure 21-43). The phenomenal increase in snowmobiling has also created serious land management problems during the winter months. As our society becomes more affluent, and as our interstate highway system shortens traveling time, growing interest in these and other activities will exert tremendous pressure on all Great Lakes Basin recreational resources. The tourist, as an element of the total requirement, must therefore be properly recognized and included in any planning effort if a quality setting for the enjoyment of outdoor recreation activities is to be maintained.

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–43 Shoreline Development. Unplanned cottage development surrounding many inland lakes has created sewage disposal and public access problems while destroying the wilderness values sought by the early cottage dwellers.

Section 4

OUTDOOR RECREATION PLAN FOR THE GREAT LAKES REGION

The purpose of this section is to present a general plan of action to meet the outdoor recreational needs of the Great Lakes Region. Specifically, this section presents a list of plan objectives, an accounting of Federal and State responsibilities, an appraisal of recreational resource potential, and an evaluation of problems and alternative solutions. Priorities for future acquisition and development within each planning subarea are also suggested.

4.1 Objectives of the Plan

Assuming that the basic purpose of the plan is to induce the development of adequate recreational opportunities in the Great Lakes Region, the following general recreational objectives should be attained:

(1) the satisfaction of urban recreational needs

(2) a sufficient quantity of quality land and water recreational areas and facilities to meet the needs of recreationists

(3) the location of necessary facilities within reasonable travel time of those who demand them

(4) the preservation and protection of significant aesthetic, historic, and natural areas for recreational use

(5) the preservation of potential recreational sites until they can be acquired or developed

(6) with certain exceptions, water of such quality that full body contact can be made without person risk

(7) stabilization of water levels in such a manner as to create high quality recreational experiences during the recreational season

(8) adequate public access on all bodies of water suitable for recreation

(9) the development of recreational facilities and land uses in such a manner that recreationists and others receive a quality experience

(10) greater utilization of the recreational potentials of the Great Lakes and their shores

(11) proper zoning and planned development of lands within and adjacent to recreational areas to enhance the recreational setting

(12) coordination of recreational programs with other related land and water uses

(13) coordination of the development of recreational facilities by both the public and private sectors to eliminate duplication of effort

4.2 Federal and State Action Programs

The responsibility for meeting outdoor recreation needs of the Great Lakes Region can be found at Federal, State, regional, local, and private levels. At present, many government agencies are contributing to the recreational supply base through their acquisition, development, technical aid, and financial assistance programs. The following paragraphs briefly outline the ongoing recreational programs and responsibilities of key Federal agencies and the roles of State and local governmental agencies.

4.2.1 Federal Responsibilities

This part of the plan identifies the outdoor recreation responsibilities of key Federal agencies.

The Department of Agriculture, through its Forest Service, conducts forest recreation research and manages the renewable natural resources of the national forest system under the conservation principles of multiple use and sustained yields for products and services, including water, forage, timber, wildlife, and recreational opportunities, to meet present and future public needs. It cooperates with the States in providing technical assistance to private forest landowners for similar management of their lands. The Soil Conservation Service provides technical assistance and financial aid for the protection, management, improvement, and development of land and water resources on small watersheds, includ-

ing recreation and fish and wildlife resources. The Department's Rural Electrification Administration provides specialized developmental, technical, and credit-finding assistance to borrowers for launching new business or industrial enterprises, including recreational enterprises. Through the Farmers Home Administration and Resource Conservation and Development Programs, the Department provides financial assistance to farmers for the development of recreational opportunities.

The Department of Commerce, through the Economic Development Administration, makes direct grants and low-interest, long-term loans to States and to businesses, including recreation or tourist enterprises, to expand or establish needed facilities.

The Department of Defense, through the Army Corps of Engineers, investigates, plans, designs, constructs, operates, and maintains many multiple-purpose developments which provide extensive opportunities for outdoor recreation, fish and wildlife conservation, and enhancement of natural beauty.

The Department of Housing and Urban Development, through the Community Resources Development Administration, administers grant programs for advance acquisition of land for public purposes, acquisition and development of open-space land, historic preservation, and demonstration. HUD makes loans and annual contributions to local public housing authorities for the development of housing and, where necessary, a limited amount of outdoor recreational facilities through the Housing Assistance Administration. Its Model Cities Administration provides grants to plan, develop, and carry out comprehensive rebuilding and restoration programs including recreational activities and facilities for communities, and development, beautification, and improvement of public land and neighborhood facilities. The Farmers Home Administration makes loans through Public Law 566 and Resource Conservation and Development (RC&D) programs to assist in the establishment of recreational developments.

The Department of Interior's Bureau of Outdoor Recreation administers the program of the Land and Water Conservation Fund Act which makes funds directly or indirectly available to Federal, State, and local agencies for outdoor recreation planning, land acquisition, and facility development, assists the States on the preparation of Statewide outdoor recreation plans, prepares the nationwide outdoor recreation plan, and conducts the outdoor recreation study of comprehensive river basin plans. It evaluates the recreational potential of urban areas, conducts natural resource area studies, coordinates the recreational planning of other Federal agencies, and transfers surplus Federal property with recreation potential to local branches of government. Through the U.S. Fish and Wildlife Service, it provides funds to develop sports fishing resources and to restore wildlife habitat, and plans, develops, and administers the natural, historical, and recreational areas which comprise the National Park System through the National Park Service.

The Department of Labor, through the Manpower Administration, provides many work-training services connected with developing vest pocket parks and recreational facilities, protecting wildlife, and aiding recreational organizations in recruiting staff.

The Department of Transportation's Bureau of Public Roads assists the States in the acquisition of interests in, and improvement of, strips of land both within the right-of-way and adjacent to highways to restore scenic beauty, and for the acquisition and development of rest and recreational areas.

The Environmental Protection Agency provides grants and technical assistance to bring the quality of the water in our streams, lakes, estuaries, and coastal areas to levels which provide adequate supplies for all foreseeable and appropriate uses, including recreation.

The Office of Economic Opportunity provides grants for comprehensive local anti-poverty campaigns in urban and rural areas, on Indian reservations, and among migrant workers. Outdoor recreation is included among eligible anti-poverty projects.

The Property Management and Disposal Services is responsible for the disposal of surplus real property no longer required for Federal needs. Such property may be made available to eligible public agencies for recreational or conservation uses.

The Small Business Administration offers loans to small businesses. Outdoor recreation businesses which have obtained loans include golf, tennis, and ski clubs; day and children's camps; marinas; tent and trailer campgrounds; bathing beaches; inns, lodges, and motels; tourist ranches; skating rinks; and horseback riding stables.

The Federal Power Commission in 1965 amended its regulations to require that licensees for hydroelectric power projects include

comprehensive plans for the public use of project waters and adjacent lands for recreational purposes, including fishing and hunting. Licensees must acquire enough land to assure optimum development of the recreation resources afforded by the project and develop suitable public recreational facilities upon project lands and waters. Such plans must be prepared in cooperation with State and local agencies and, in cases affecting lands of the United States, with the Federal agency having supervision.

4.2.2 Federal Legislation

This section identifies the more important Federal legislation influencing outdoor recreation planning, acquisition, and development.

(1) The Land and Water Conservation Fund Act of 1965 authorizes 50 percent matching grants to States and their political subdivisions for planning, acquisition, and development of outdoor recreation resources. Acquisition and development assistance is available for State and local projects which are in accord with a State's comprehensive outdoor recreation plan. This program is administered by the Bureau of Outdoor Recreation.

(2) The Multiple Use-Sustained Yield Act of 1960, PL 86-517, specified outdoor recreation as one of the purposes for which national forests shall be administered.

(3) Under Title VII of the Housing Act of 1961, as amended by Title IX of the Housing and Urban Development Act of 1965, States and local public agencies may receive up to 50 percent of the total costs for acquisition and development of open space lands for park, recreation, conservation, scenic, or historic purposes in urban and suburban areas.

(4) Title IX of the Housing and Urban Development Act of 1965 authorizes assistance grants to be made to States and local public bodies in carrying out local programs for urban beautification and improvement.

(5) Title IV of the Agricultural Act of 1962 permits the Farmers Home Administration (FHA) to make loans to individual farmers for development of income-producing outdoor recreation enterprises. The FHA may also make loans up to $500,000 to non-profit associations and insure loans up to $1 million for effecting changes in land use including the development of recreational facilities.

(6) Under Section 101 of the Food and Agriculture Act of 1962, the Department of Agriculture can enter into long-term agreements with farmers to convert land regularly used for crop production into recreational projects.

(7) Title VI of the Food and Agriculture Act of 1965 allows the Department of Agriculture to enter into long-term agreements with farmers to convert land regularly used for crop production to practices or uses that will conserve soil, water, and forest resources. Agreements may be made to establish, protect, and conserve open space, natural beauty, wildlife habitat, and recreational resources; and to prevent air and water pollution. The Department of Agriculture is also authorized to make grants to all levels of government for the acquisition of cropland to preserve open spaces and natural beauty, to develop wildlife habitat and recreational facilities, and to prevent air and water pollution. The Department also shares costs with farmers to control sedimentation of streams, lakes, and ponds, and to improve wildlife habitat.

(8) Under the feed grain program of the Agricultural Act of 1970, croplands "may be devoted to wildlife food plots or wildlife habitat .... The Secretary may provide for an additional payment on such acreage in an amount determined by the Secretary to be appropriate in relation to the benefit to the general public if the producer agrees to permit, without other compensation, access to all or such portion of the farm as the Secretary may prescribe by the general public, for hunting, trapping, fishing, and hiking . . ."

(9) Under the provisions of Public Law 566, the Watershed Protection and Flood Prevention (small watershed) Act of 1954, as amended by the Food and Agriculture Act of 1962, the Department of Agriculture may share with State and local agencies up to one-half of the cost of land, easements, and rights-of-way for reservoirs and other areas to be managed by State or local sponsors for public recreation. Cost sharing is also available for developing facilities needed for recreation.

(10) The Federal Water Projects Recreation Act of 1965 states that full consideration shall be given to recreational and fish and wildlife enhancement as purposes of Federal water resource projects. It encourages non-Federal agencies, States, and local entities to assume responsibility for the operation and maintenance of that part of each project utilized for recreational and fish and wildlife purposes, and permits entrance fees and other charges to offset expenditures incurred. It requires that non-Federal agencies

pay one-half of the original costs of land acquisition and recreational facility construction, except in national recreation areas where the Federal government pays up to 100 percent.

(11) Under the provisions of the Water Quality Act of 1965, the Environmental Protection Agency is authorized to provide financial assistance to States and municipalities for the prevention, control, and abatement of water pollution through two means. It may give grants for construction of sewage treatment works up to 30 percent of the eligible project costs (if States provide sufficient matching funds and the project is contained in a Regional Planning Agencies Plan, the Federal share may be increased to 55 percent), and it may give grants up to 75 percent of the total cost of facilities that will demonstrate new or improved methods of controlling discharge of waste from storm sewers or combined storm and sanitary sewers. To qualify, such projects must be approved by the appropriate State water pollution control agency.

(12) The Federal Water Pollution Control Act of 1970 declared it to be the policy of Congress to recognize, preserve, and protect the primary responsibilities and rights of the States in preventing and controlling water pollution, to support and aid technical research relating to the prevention and control of water pollution, and to provide Federal technical services and financial aid to State and interstate agencies and to municipalities in connection with the prevention and control of water pollution.

(13) The Dingell-Johnson Program helps States to develop sports fishing resources with funds derived from a 10 percent manufacturer's excise tax on fishing equipment. The Federal funds allocated from this program are matched by 25 percent State funds.

(14) Under the Pittman-Robertson Program, States receive grants for improving and restoring wildlife habitat. The revenue from these grants is derived from the proceeds of an 11 percent manufacturer's excise tax on sporting arms and ammunition. These funds are also matched by 25 percent funds from the State. This program is administered by the U.S. Fish and Wildlife Service, Department of the Interior.

(15) The Environmental Education Act of 1970 "encourages and supports the development of new and improved curricula to encourage understanding of policies, and support of activities designed to enhance environmental quality and maintain ecological balance . . . to provide support for the initiation and maintenance of programs in environmental education at the elementary and secondary levels . . . to provide for community education programs on preserving and enhancing environmental quality and maintaining ecological balance. . . ."

(16) The National Wild and Scenic Rivers Act of 1968[49] declares that certain selected rivers of the nation which, with their immediate environment, possess outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing conditions, and that they and their environments shall be protected for the benefit and enjoyment of present and future generations. This Act designates certain rivers as components of the national wild and scenic river system and also names other rivers for potential addition to the system. Three types of rivers are designated under the provisions of this Act. A "wild river" is one free of impoundments and pollution and is accessible only by trails; the watershed and shoreline are essentially primitive. A "scenic river" is also largely primitive and free of impoundments, but accessible in places by roads. A "recreational river" is one readily accessible by road or railroad, which may have development along its shoreline and may have undergone some impoundment or diversion in the past. The Act also calls for close Federal and State cooperation in the selection of and planning for particular river areas, including a determination of the degree to which a State or political subdivision might participate in the preservation and administration of rivers named to the national system.

(17) The National Trails System Act of 1968[50] states that trails should be established near urban areas and within established scenic areas more remotely located. The Act prescribes the methods and standards to be followed when establishing a component of the national system of trails, and includes a provision for Federal cooperation with States and other political subdivisions.

4.2.3 State and Local Responsibilities

The States play a pivotal role in recognizing, developing, and managing outdoor recreation resources of less than national and more than local significance. State responsibilities and programs include:

(1) acquiring, developing, managing, and maintaining resources of State significance

(2) funding through taxation, bond issues, and user fees

(3) assisting local governments and private enterprise in planning and developing recreational facilities at neighborhood, city, and regional levels

(4) providing legislative authority for zoning and local bond issues, utilizing a concession system on State owned lands, and cooperating with Federal and other State governments

Local governments are in the best position to know and evaluate the outdoor recreation needs of communities and neighborhoods and to work closely with citizens and local organizations in seeing that such needs are recognized, understood, and effectively met. Specifically, local level responsibilities include considering playground, municipal park, and open-space requirements in any urban expansion or renewal project; managing flood plain areas; funding through taxation, bond issues, and user fees; acquiring, developing, and managing public recreational areas; utilization of zoning, subdivision regulations, and assessment practices; and cooperating with and encouraging industrial firms and private investors to help meet the needs of the community.

State and local governments derive their authorities to acquire land, develop recreational facilities, and manage recreational areas through State constitutional and legislative actions. Such authorities are quite variable from one State to another.

In Illinois the Department of Conservation "is authorized to purchase or acquire by any legal manner title to lands" for State parks, State forests, and nature preserves as set forth in the Illinois Revised Statutes, 1967, Chapter 105, Section 465–490.10.[14]

The Department of Public Works and Buildings is authorized "to plan and devise methods, ways, and means for the preservation and beautification of the public bodies of water of the State and for making them more available for the use of the public" through the Illinois Revised Statutes, 1967, Chapter 19, Sections 63 and 66.

The Illinois State Parks Revenue Bond Commission is authorized "to undertake and financially support projects which will improve the State park system . . . through the acquisition and development of land" by the Illinois Revised Statutes, 1967, Chapter 105, Section 490.0. "The amount of bonds issued at any one time by the Commission may not exceed $9,000,000."

Cities are authorized to provide for the establishment, maintenance, and operation of recreation systems through Chapter 24 of the Illinois Revised Statutes. There are several conditions, depending on the size of the city.

Park districts may levy taxes for general operating purposes not to exceed one mill, recreation programs not to exceed twenty-five hundredths of one mill without a referendum, and specific additional operating needs by referendum not to exceed fifty hundredths of one mill.

They may also issue general obligation bonds up to five-tenths of one percent of the assessed valuation without referendum, or up to 2.5 percent of the assessed valuation with a referendum.

Corporate authorities may levy taxes, subject to referendum, of nine-tenths of one mill for playgrounds and recreation centers, of one-tenth of one mill to purchase and maintain public parks and of three-tenths of one mill to purchase land for parks. They may issue bonds for recreational development in the same manner as prescribed by law for other purposes.

Under Section 22 et seq., Chapter 57½ of the Illinois Revised Statutes, counties are authorized to create and manage forest preserve districts. Forest preserve districts may levy taxes up to twenty-five hundredths of one mill with referendum. They also have the power to assess an additional seventy-five hundredths of one mill for acquisition purposes only. These districts may issue bonds not to exceed five-tenths of one percent of the assessed value of taxable property.

The Indiana Department of Natural Resources was established to succeed the Department of Conservation on July 1, 1965 (Acts of 1965, Chapter 44). The Bureau of Land, Forest, and Wildlife Resources, one of two bureaus in the Department, has the responsibility for forests, fish and wildlife, parks, outdoor recreation, reservoir management, nature preserves, and other miscellaneous resources.[15]

The State Highway Commission has responsibility for the provision of roads in State parks, forests, recreation areas, and fish and game areas; the provision of roadside parks, historical markers, and roadside table sites; the Highway Beautification Program; and a proposed Scenic Roads and Parkway Program, as well as various other responsibilities.[15]

Many city or town park and recreation boards receive their legal status for operation from the 1965 Park and Recreation Law

(amended in 1969—Burns Statutes 48-5851-5858). A number of cities operate under the First Class Cities Law (Burns 48-5501-5533), under the Playground and Recreation Centers Act in Cities (Burns 48–5901–5907), and under the Public Parks Act in Cities (Burns 48-5731-5742). A number of cities operate under the various other State statutes.[15]

The 1965 Parks and Recreation Law "provides for (1) the creation of park and recreation boards in counties, cities, and towns; (2) a means of raising revenues through a special countywide or citywide taxing district with bonding authority . . ."

An amendment authorizes city and county park and recreation boards to bond up to two percent of the assessed valuation of the park district. Bonds carry no interest ceiling.[15]

The Michigan Department of Natural Resources, created by Act 17, Public Acts of 1921, has the State's greatest responsibilities for the development of outdoor recreation. This department was "authorized to prepare, maintain, and keep up-to-date a comprehensive plan for the development of outdoor recreation resources of the state" by passage of Act 316, Public Acts of 1965.[21]

The Huron-Clinton Metropolitan Authority in southeastern Michigan was established by Act No. 147 of the Public Acts of 1939. It includes five counties surrounding the Detroit area. It is financed principally by a tax levy limited to twenty-five hundredths of one mill on the assessed value of taxable property in the five-county area.[45]

County boards of supervisors, either singly or as two or more contiguous counties, were authorized to create park and recreation commissions by Act 261 of Public Acts of 1965. These commissions have the power to ascertain recreational needs within the area, to acquire land, and to develop and maintain recreational facilities. Funds for their operations are appropriated by the respective county boards of supervisors. They have no taxing or bonding powers but may charge user fees.[21]

In Minnesota, the Department of Conservation, through its several divisions, is authorized to acquire, develop, and manage land and water for recreational purposes through the Reorganization Act of 1967. State funds for acquisition and development are appropriated by the legislature.[28]

The 1961 County Park Law, M.S. 1961, Chapter 512, authorizes counties to establish, maintain, and operate county parks. Counties can levy taxes at a rate not to exceed ten percent of the maximum levy authorized by law for the Road and Bridge Fund.[28]

The Ohio Department of Natural Resources is authorized to provide parks and recreational facilities at the State level through Chapter 1501.07 of the Ohio Code. The Division of Parks, through its Chief, has the power to establish user fees.[37]

Local park districts can be established over all or part of the land within any given county by the authority of Chapter 1501.07 of the Ohio Code. These districts can acquire and develop lands and can levy taxes up to five-tenths of one mill on taxable property. An additional three-tenths of one mill can be levied with a referendum.[37]

4.3 Recreation Potential of Water Resources

This section examines the recreation potentials of each of the major water resource features within the Region. Specific details relating to resource potentials within each planning subarea are stressed in Subsection 4.6, Specific Features of the Plan. The following paragraphs are intended to relate to both publicly and privately owned resources. However, due to a lack of data, acreage figures are not always given for the privately owned resources.

4.3.1 Great Lakes

For planning purposes it is assumed that the water-surface acreage of the Great Lakes having recreational potential is limited to an area within two miles of the shoreline. Use of the approximately five million acres of water within the area is virtually dependent upon the improvement of water quality and the development of additional boat harbors, marinas, and public access sites. The latter could be developed at many places along the shores of the Lakes, especially in the southern part of the Region where large populations are concentrated and where weather is more favorable.

4.3.2 Inland Lakes

Nowhere in the United States are inland lakes more abundant than in areas of the Great Lakes Region. Thousands of inland lakes in the Region contain more than 2.1 million acres of water surface. In the southern portion of the Region, some of these lakes are

being used to or beyond capacity. In the northern part, especially in northern Michigan, Wisconsin, and Minnesota, many lakes receive little use, yet possess considerable potential. To realize their full potential, planning efforts must include provisions for zoning ordinances and accessibility, both of which promote resource protection and user distribution. Recent studies in Wisconsin have shown that at least 25 percent of the shoreline of inland lakes should be retained in an undeveloped, natural state to provide the necessary areas for fish spawning, other wildlife and fish habitat, littoral zone preservation, and scenic backdrop to developed areas.

Overdevelopment, accelerated eutrophication, and limited public access are critical problems confronting the recreational use of inland lakes. As more and more waterfront property is subdivided for residential development, these problems become more acute. Recognizing the value of our inland lakes and lakeshores, Senator Gaylord Nelson of Wisconsin introduced a bill, S. 280, to the 92nd Congress that would establish a National Lake Areas System to

> . . . preserve, protect, develop, and restore the Great Lakes and other lakes of the United States; make accessible for the benefit of all the people selected parts of the Nation's lakes which are valuable for fishing, hunting, conservation, recreation, and scenic beauty; and establish, support, and encourage programs of lake and lake area research, and for the training of scientists in fields related to such research.[54]

This session of Congress took no action on the bill.

4.3.3 Estuaries and Marshes

Wetland areas could provide an unusual opportunity for recreational use if small areas of adjacent uplands were acquired for development of facilities for camping, picnicking, hiking, nature study, and similar activities not detrimental to wildlife in such areas. Activities harmful to wildlife within the area should be excluded.

4.3.4 Impoundments

There are many potential reservoir sites in the Great Lakes Region. Single- and multiple-purpose reservoirs offer opportunities for an expanded recreational resource base. Constructed by government agencies or by private enterprise, they have the capability to satisfy many recreational requirements. Where any impoundment is constructed, recreation should be included as a purpose. The recreational potential should be developed as needed to the optimal potential of the site. Near urban areas, relatively small, single-purpose recreational reservoirs could be justified although Federal construction would require changes in existing legislation. Farm ponds can also provide opportunities for certain types of activities such as fishing and swimming, but private ownership limits their potential.

4.3.5 Streams

The Region contains thousands of miles of streams, but their recreational use is often precluded by the lack of accessibility, the dumping of pollutants, or the construction of dams. In 1968, Congress recognized that many of our streams possess scenic, recreational, geological, historic, or cultural values that should be preserved for the enjoyment of future generations (Figure 21–44). Similar legislation has been enacted by Wisconsin, Michigan, and Ohio. In addition to those streams classified as national or State wild and scenic rivers, 26 other streams or stream segments are herein presented as potential additions to a national or State stream preservation program (Table 21–17).

4.4 Recreation Potential of Land Resources

The land resources within the Great Lakes Region are as diverse as its water resources, and are treated in this study in the same manner (Subsection 4.3).

4.4.1 Beach Areas

Usable beaches open to the public represent only 37 percent of the total Great Lakes beach area. Private beaches open to the public account for only four percent of the total. Thus, 59 percent of the total, or more than 3,200 acres, is not open to the public.[16] Similar access problems can be found with respect to the unknown quantity of inland lake beaches.

The potential for additional development is heavily dependent upon the closed, privately owned beaches. Nearly one-half of the private beaches not open to the public have some potential for recreational development (Figure

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–44 Scenic River. The Pike River of northern Wisconsin has been identified as a potential addition to a scenic or natural rivers system.

21–45). Needed, perhaps, is legislation dealing with the Great Lakes beaches that would be similar to the Congressional bills introduced in 1971 that ". . . affirms that the [ocean] beaches of the United States are impressed with a national interest and that the public shall have free and unrestricted right to use them . . ."[48] Long stretches of Great Lakes beaches would then be available to help satisfy public recreational needs. In addition, water pollution abatement and intensified development of existing public beaches could help meet some of the regional requirements.

4.4.2 Island Areas

Several groups of islands have substantial recreational potential. The Apostle Island group is already included in the Apostle Island National Lakeshore (Figure 21–46), while North and South Manitou Islands are authorized to be included in the Sleeping Bear Dunes National Lakeshore. Other island groups offering significant possibilities for a wide range of activities include the Bass, Green Bay, Potagannissing Bay, Presque Isle, Beaver, and Thousand Islands.

TABLE 21-17 Potential Additions to Stream Preservation Programs

State	Stream	
Michigan	Carp	Presque Isle
	AuSable	Rifle
	Escanaba	White Fish
	Black	Pine
	Little Manistee	Tahquamenon
	Manistee	Two Hearted
	Manistique	Ocqueoc
	Muskegon	Ontonagon
Minnesota	Vermillion	Little Fork
	St. Louis	Clouquet
	Brule	Pidgeon
Ohio	Chagrin	Grand
New York	St. Lawrence	
Illinois	Fox	
Indiana	Elkhart	
Wisconsin	Wolf	Brule
	Peshtigo	Flambeau*
	St. Croix*	Namekagon*

*Although these streams flow into the Mississippi River, their headwaters lie within the planning boundaries of this framework study.

The Bass Islands of Lake Erie, easily accessible to the Toledo and Cleveland areas, encompass about 6,000 acres of vineyards, open fields, and scrub growth that have long provided the setting for resort and cottage development. Some of the best fishing on Lake Erie is located in the vicinity of these islands.

The Green Bay Islands of Lake Michigan comprise almost 22,000 acres on 14 wooded and pristine islands. The resident population is small and the recreational opportunities could serve the Milwaukee-Chicago urban complex.

The Potagannissing Bay Islands, a group of approximately 50 islands located in Lake Huron off Michigan's Upper Peninsula, contains much sheltered water and provides an ideal setting for fishing, boating, and hunting. Presently, approximately one-half of Drummond Island is a Michigan State forest.

Presque Isle, near Erie, Pennsylvania, becomes an island only during extremely high water periods. Established as a State park in

Courtesy of Michigan Tourist Council

FIGURE 21-45 Need for Open Beaches. Fifty-eight percent of the total Great Lakes beach area is privately owned.

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21–46 Apostle Islands. The scenic and wilderness qualities of the Apostle Islands were threatened with real estate development until Congress established the Apostle Islands National Lakeshore in 1970.

1921, the highly developed tourist and recreational area is threatened with erosion and pollution problems. The 3,000-acre area possesses little potential for additional development.

Both the Beaver Islands of northern Lake Michigan and the Thousand Islands area of the St. Lawrence River still possess potential for recreational development. Nearly 17,000 of the 46,000 acres in the eight Beaver Islands are publicly owned, while thousands of acres in the Thousand Islands are as yet undeveloped.

4.4.3 Flood Plain Areas

There are 945,000 acres of flood plains along main stem and principal tributary streams of the Great Lakes Region. In 1970, more than 825,000 acres were in rural areas and 120,000 acres were in urban areas. The acres of flood plains in urban areas are increasing as cities continue to spread over the landscape. Much of the total is still available for recreational development and could provide needed recreation readily accessible to urban residents. These flood plains are adaptable for the development of a full range of recreational opportunities and open spaces, although such flood plain values have not been given adequate consideration in previous resource plans.

Flood plain development in most areas has been the result of individual effort with little or no concern for the type or location of development, or the susceptibility of such developments to flood damage. Recently enacted Statewide flood plain zoning regulations in Wisconsin, Minnesota, and Michigan should be considered only an initial effort to insure protection of these environments. Developing the resource potentials of flood-prone areas requires the coordinated efforts of all resource interests.

River management plans, especially those in areas where demands on the resource base are greatest or in areas deserving special attention due to outstanding resource features, should include the establishment of environmental corridors, scenic rivers systems, river walkways, open space considerations, and water quality improvement measures. In some areas, amending zoning laws in order to permit strip zoning should be considered. Reclamation programs should receive appropriate attention where marginal developments exist or where developments have been abandoned.

4.4.4 Urban Areas

Resources available for recreational use and development are usually limited in urban areas because of other land use pressures (Figure 21–47). However, various types of resource areas in most urban areas have been overlooked during urban expansion or have deteriorated and need to be redeveloped. Examples include waterfronts, flood plains, abandoned railroad yards and rights-of-way, mined areas, and old dump areas. Creative design, innovative developments, and effective reclamation practices could make these neglected areas productive.

Recreational opportunities and open space can also be provided by the reclamation of sand and gravel quarries and the formation of islands from dredge spoils. Residential and commercial developments have often resulted in severe damage to the ecology of an area and precluded its recreational use. Therefore, where recreational opportunities and open space are especially limited, the preservation of existing wooded areas should be given due consideration.

4.4.5 Fish and Wildlife Areas

The Great Lakes Region contains fish and wildlife refuges and hunting areas which have potential to satisfy other types of recreational activities. Public hunting areas alone amount to 589,000 acres, and fish and wildlife habitat areas contain some of the more aesthetically and ecologically valuable resources of the Region. Total acreage devoted to fish and wildlife amounts to approximately 2.6 million acres. Past planning efforts have focused mainly on providing fishing and hunting opportunities. Minimal consideration has been given to developing other recreational potential. Future planning and development should be dictated by the individual area's capacity to provide quality opportunities without depreciation of ecological values. Through innovative and discriminating design techniques, zoning, careful selection of the types of facilities to be developed, and encouragement of activities requiring little or no development, increased opportunities can be provided for picnicking, camping, sightseeing, hiking, nature study, and photography with minimal threat to the

Courtesy of Bureau of Outdoor Recreation, Wisconsin

FIGURE 21–47 Urban Recreation Limited. A soap box race at the county institution for wards of the county, Milwaukee, Wisconsin.

wildlife community. Thus, if one-half of one percent of these lands were developed for associated recreational activities, an additional 13,000 acres of developed recreational lands would become available for use.

Increased development or use of fish and wildlife areas is often hindered by Federal or State legislation. For instance, many fish and game lands are purchased on a State-Federal cost-sharing basis with funds available through the Pittman-Robertson program. These funds are for improving and restoring wildlife habitat, and land purchased with them may not be used for providing general recreational facilities. Legislative reforms may be necessary if these lands are to be used for certain recreational activities, especially camping and picnicking.

4.4.6 Forests

Forests, with their relatively undisturbed resource settings, offer some of the greatest potential sources of future recreational opportunities. Within the Great Lakes Region, 4.7 million acres of commercial forest lands are administered by the U.S. Forest Service, 0.4 million acres are administered by other Federal agencies, 5.2 million acres are administered by the respective States, 2.6 million acres are administered by local levels of government, and 24.8 million acres are owned by private interests.[10]

In addition to the 4.7 million acres of commercial forest, the U.S. Forest Service administers the Boundary Waters Canoe Area, the Sylvania Recreation Area, and the McCormick Tract. Located in northern Minnesota, the Boundary Waters Canoe Area encompasses 873,000 acres of forests, lakes, and canoe streams. The Sylvania Recreation Area, located in Gogebic County, Michigan, is administered by the U.S. Forest Service and contains 14,000 acres of wooded land and 4,000 acres of lakes and streams. The McCormick Tract, approximately 17,000 acres in size, is located in Marquette and Baraga Counties of Michigan. This experimental research forest has potential for controlled wilderness recreation.

To realize the recreational potential inherent in these forest resources, programs must stress development that does not appreciably alter the character of the resource setting. This would be a particular objective in the Boundary Waters Canoe Area, the Sylvania Recreation Area, and the McCormick Tract. Protection of the resource should be the primary concern.

At the present time, only a small percentage of the potentially developable forest lands are developed for recreational use. Based on data provided by the U.S. Forest Service and the States, it is estimated that 40,000 acres of national forest lands and 17,500 acres of State forest lands could be developed for intensive recreational use. If one-half of one percent of the locally owned public forest lands, most of which are county forests in upper Wisconsin, were developed for intensive use, they could provide an additional 13,000 acres of recreational opportunities. Although the acreage of private forests with recreational potential is unknown, this sector should not be ignored. The owners of private lands should be encouraged through tax incentives and other means to provide recreational opportunities on such lands in the future.

4.4.7 Parks

The potential for the development of additional recreational opportunities in national, State, regional, and local parks lies within their undeveloped as well as their extensively developed portions. In 1970, existing and authorized national parks and lakeshores encompassed approximately 367,000 acres. Isle Royale National Park, located in Lake Superior, encompasses 134,000 acres, and has been in existence for a number of years. Although considerable recreational potential exists within this area, increased development would occur at the sacrifice of a wilderness setting now considered to be its main attraction.

In the last two years, four new lakeshore areas have been established by Congress. Pictured Rocks National Lakeshore, the first such area in the Region, is located on the south shore of Lake Superior in Alger County, Michigan, and will encompass approximately 65,000 acres. The Indiana Dunes National Lakeshore, located on Lake Michigan in Porter County, Indiana, was established by Congress in 1969. When acquisition is completed, it will encompass more than 8,700 acres of Lake Michigan shoreline, sand dunes, and marsh. Located on the south shore of Lake Superior in Bayfield County, Wisconsin, the Apostle Islands National Lakeshore was established in 1970 and will encompass 20 islands and more than 42,000 acres of islands and adjacent mainland. The Sleeping Bear Dunes National

Lakeshore, also authorized in 1970, is located on Lake Michigan in Leelanau and Benzie Counties, Michigan, and will contain approximately 46,000 acres upon completion of acquisition.

Congressional legislation established a 32,500-acre Ice Age National Scientific Reserve in Wisconsin in 1964. Approximately 27,700 acres of this area are located within the Great Lakes Region. Funds have been appropriated to the State of Wisconsin for purchase of lands for this nationally significant area.

The Kabetogama Peninsula, lying between Lakes Rainy and Kabetogama in the northwest corner of St. Louis County, Minnesota, was authorized for acquisition as a national park in January 1971. The area will encompass 219,000 acres and will be known as Voyageurs National Park. An addition of 13,000 acres to the Grand Portage National Monument of northeastern Minnesota has recently been proposed.

Of significance are the more than 554,000 acres of State and local parks, 402,000 acres of which are State-owned. Many of these parks, especially those near urban areas, are presently being used at or beyond their capacity, while others, such as those within the Cleveland Metropolitan Park District of northern Ohio, have only modest development. In some instances, policy decisions by the governing entities have limited the intensity of recreational development to maintain a high-quality setting for recreation.

4.4.8 Trails

Along the urban-to-wilderness continuum, there is almost unlimited potential for additional trails in the Great Lakes Region. The concept of bringing parks to the people has opened the door to hiking, bicycling, horseback riding, and nature study trails in and between cities. Resources available for nonurban hiking trails and snowmobile and other off-the-highway vehicle trails, especially in the northern portion of the Region, have only begun to be developed.

One proposed national scenic trail, the North Country Trail, is within the Great Lakes Region. It would be approximately 3,200 miles in length and would run from the Appalachian National Scenic Trail in Vermont to the Lewis and Clark Trail in North Dakota. After crossing New York State, the trail, as proposed, re-enters the Region again in the western part of Ohio, traverses the Lower Peninsula of Michigan along the Lake Michigan shore, crosses the Upper Peninsula of Michigan near the Lake Superior shore, and passes westward through Wisconsin and Minnesota.

4.4.9 Other Scenic, Historic, and Biotic Areas

Much of the Region contains an assortment of scenic, historic, and biotic landscapes which could provide a wide range of recreational opportunities if preserved and made available for public use. Other valuable landscapes include morainic and mountain areas in addition to the previously discussed Great Lakes, inland lakes, beaches, forests, parks, and stream corridors. It has been noted in past studies that many of these scenic areas tend to be concentrated along stream corridors. Where stream valleys are acquired and developed for recreational use, a substantial number of these areas may be included to add interest to the entire area.

Appendix 22, *Aesthetic and Cultural Resources*, has identified those scenic, historic, and ecological areas that have local, regional, or national significance. Very few of these areas exist in Planning Subarea 4.2, but there are many in Planning Subareas 5.3, 1.2, and 2.1. Significant areas of cultural, historic, archaeological, and ecological interest should be preserved.

4.5 Alternative Solutions

Alternatives are presented in this study as they relate to major problems that must be alleviated before recreational needs can be satisfied. The following alternatives have been divided among several broad categories: acquisition, development, funding, access, resource improvement, and program improvement.

4.5.1 Acquisition

Acquisition of land for recreational use is often difficult because of economic competition for land. Inner-city and suburban land prices are high. Land in many urban areas, especially in urban cores, has often been developed for other more intensive uses. Little land was left for playgrounds and neighborhood parks. Some cities did reserve land along

lakeshores or other quality areas, but these areas are usually in limited supply. In addition, population densities in central urban areas have been increasing in recent years, promoting rising land prices in urban areas where the need for recreational opportunities is greatest.

In some areas of the Region, acquisition by fee is necessary if recreational requirements are to be met. With approximately 80 percent of the land privately owned and an almost equal amount unavailable for recreation because of conflicting land uses, any outdoor recreation plan for the Great Lakes Region must consider acquisition as a primary alternative. Alternatives to fee acquisition include the use of easements, more intensive development of existing recreational lands, changes in an area's zoning structure, and leasing agreements. Several of these will be discussed in greater detail in later sections of this appendix.

Another problem arising from the acquisition of land by fee for recreational use is removal of such lands from the tax base and the resultant corresponding loss of revenue to the local governmental unit. A solution to this problem, especially where large tracts are purchased by regional, State, or Federal agencies, might be the reimbursement of local governments by the purchaser for taxes foregone for a period of possibly ten years.

4.5.2 Development

Recreational needs cannot be met by acquisition of land alone. A planning program must also include developmental alternatives that will provide facilities for outdoor recreation experiences. The type and intensity of such development will undoubtedly be influenced by its location along the urban-to-wilderness continuum.

4.5.2.1 Developmental Standards

Standards for space requirements are used in the development of most parks and recreational areas. Although no national set of standards or guidelines has been devised to meet the needs of all areas and circumstances, the concept of developmental standards (e.g., five campsites per acre) has been used to create and maintain a recreational environment. To lower these standards would mean the possibility of promoting overuse of resources and consequent public dissatisfaction with the recreational experience.

While it is desirable to add acreage to existing inventory to meet increasing needs rather than lowering space requirement standards, such action is not always possible, especially in or near urban areas. Lower space standards may have to be considered as an alternative in the more populated areas now, and in less populated areas in the future. If lower standards are accepted as a means of meeting needs, improved facility design and area management policies will also be needed in many recreational areas if environmental quality is to be maintained.

4.5.2.2 Increased Development of Existing Recreation Lands

The methodology used in this appendix assumes that intensely developed lands should constitute an average of 50 percent of the total land area of Class I lands, and 15 percent of Class II lands. However, there are many recreational areas in the Region that do not approach this level of development. Therefore, one possibility that planners and managers, especially in the southern portion of the Region, must now consider is to develop existing recreational areas more intensively. Since requirements are greatest near urban areas, priority should be given to more intense development within the urban day-use zone. This could be accomplished with intensive development on some of the present buffer areas of Class I and Class II recreational lands. Such areas presently provide space for low-density recreational activities (e.g., hiking, fishing, and hunting), buffer recreational development against adjacent incompatible land uses, and provide reserve land for future expansion. It is suggested that the amount of undeveloped land in many areas of the Basin could be reduced while recreational capacity is increased without seriously damaging the aesthetic setting needed for pleasurable recreation. On the other hand, the extensively developed 50 percent of Class I and 85 percent of Class II lands can also provide some measure of open space in urban areas.

4.5.2.3 Development of Environmental Corridors

The relationship between recreational development and aesthetics is considered in Ap-

pendix 22, *Aesthetic and Cultural Resources.* Environmental corridors in urban and rural areas that isolate critical hydrologic, topographic, historic, and vegetative features are considered important for future recreational developments. A river passing through a city, for example, may be the focal point of a corridor containing a minimum of development. If acquired and protected, such an area could form a nucleus for urban recreational development. Environmental corridors have already been identified and incorporated into a land-use plan for the Root River of southeastern Wisconsin. To supply adequate open space in and near urban areas would require the acquisition of thousands of acres of additional lands to provide the necessary cultural amenities, educational reserves, community appearance, and preservation of environmental quality. No attempt has been made in this appendix to calculate the needs for such lands.

4.5.2.4 Inner-City Development

Today, population is most dense in metropolitan areas where little land was reserved for recreation (Figure 21–48). Because land prices are highest in urban areas, it is difficult for recreation to compete with other uses which can return an annual net of thousands of dollars per acre.

Generally, within the central area of a city, the present intensive recreational developments, high land costs, and complex ownership patterns inhibit future recreational development. Migration to the suburbs by individuals, business, and industry also inhibits such development by removing private capital investments and taxable incomes. Furthermore, the location of industry along watercourses is often essential to facilitate water supply, waste disposal, and economical waterborne transportation of materials and products. Too often, however, nonessen-

Courtesy of Michigan Tourist Council

FIGURE 21–48 Highly Developed Urban Area. Inner-city land prices are high and lands have often been developed for other, more intensive uses. Little land was left for playgrounds and parks.

tial uses of these valuable shorelands soon appear after industry locates. Municipalities also contribute to waterfront blight with run-down housing, parking lots, coal storage piles, sanitary land fills, and other poorly planned developments. Lack of planning, especially of the shorelands, has led to a seriously degraded condition which could often be corrected by the relocation or renewal of certain municipal and industrial developments.

Effective methods of overcoming problems of limited open space and increasing costs include optimum multiple use of rooftops, alleys, highway interchanges, rights-of-way, and flood plains; compatible recreational use of schools, stadiums, and other public buildings; extended use of facilities through night lighting; use of portable facilities; and development of lot-sized play parks on a temporary basis. Other alternatives include the redevelopment of unsightly waterfronts and blighted areas and the construction of offshore recreational islands and peninsulas in the Great Lakes. Many of these alternatives have already received attention. Examples are the adaptation of English roof gardens to San Francisco's Golden Gateway urban renewal project[67] and the 1967 preliminary feasibility study of creating islands in Lake Michigan.[31] Of the alternatives listed above, redevelopment of unsightly waterfront and other blighted areas possesses possibly the greatest potential for meeting inner-city needs. Primary consideration should be given to riverfront parks, playfields, marinas, or other similar water-oriented shoreland uses.

4.5.2.5 Reservoirs

Numerous rivers in the Region possess potential reservoir sites. Once dams are constructed and the adjacent lands adequately developed, many water-oriented recreational needs could be satisfied. Several factors prevent such development of many sites, including growing opposition to dams by local property owners and conservationists, the legal obstacles to justifying a reservoir for single-purpose recreational use, a desire by some to forego a reservoir system in favor of a valley preserve system with recreational nodes, and the inability of non-Federal entities to fulfill cost-sharing responsibilities for reservoir-associated recreational facilities.

Organized public opposition to damming streams is not likely to abate in the near future. As exemplified by the National Wild and Scenic Rivers Act of 1968, there is great concern for a policy that would preserve streams in their free-flowing condition. A modification in policy would include construction of relatively small, single-purpose recreational reservoirs in and near urban areas where many water-oriented recreation needs are evident.

It is unlikely that the need for a tremendous amount of water surface acreage in many portions of the Region will be met. Therefore, many people desiring to participate in boating or water-skiing will need to accept lower standards for space than those used in the development of projected needs; spread their participation in such activities throughout the week; seek opportunities to satisfy their desires for water-oriented activities in facilities located outside of this watershed; and seek to satisfy their desires in other recreational activities.

4.5.2.6 Development by the Private Sector

Developing quality recreational facilities to meet the Region's needs is a responsibility of both the public and private sectors of the economy. At present the private sector provides a broad array of recreational opportunities—camping, swimming, golfing, snow skiing, horseback riding, ice skating, picnicking, and outdoor games and concerts. Private facilities are provided by country clubs, summer homes, mining and timber companies, boat and riding clubs, utility lands licensed by the Federal Power Commission, clubs operated by homeowners associations and apartment complexes, company recreation areas provided for employees, and other similar projects. Information on the extent of facilities provided by the private sector is inadequate. In some areas little is known about the extent or quality of facilities provided by the private sector. There is a need to explore the potential public use of private facilities such as piers and parking lots when these facilities are not being used to accommodate private enterprise.

The private development of quality recreational facilities for golfing, snow skiing, camping, picnicking, swimming, and other activities should be encouraged where it can function effectively (Figure 21–49). Public investments, when properly planned, can be powerful catalysts for private development of facilities to meet a portion of the recreational needs. The requirement for quality development also includes restraint in roadside advertising. Signs which are constructed must be designed to blend as harmoniously as possible into the natural landscape.

Courtesy of Michigan Tourist Council

FIGURE 21–49 Ski Slopes. A winter ski area is only one of the many types of recreational facilities that the private sector can provide.

4.5.2.7 Zoning

Recreational resource use is often in conflict with other land uses. Through zoning, provisions could be made to combine recreation with other land uses and to control expansion, such as indiscriminate lakeshore development, in key recreational resource areas. England has effectively incorporated private holdings with compatible land uses into its national parks while maintaining aesthetic control.[67]

Some local governments in the Region encourage builders to donate land for parks through alternate-density zoning (arranging homes closer together and deeding open space tracts to a public body) and through planned unit development (careful planning of an area so all types of development desired in a community can be accommodated in the most efficient and economical arrangement for the site and the needs and desires of the residents). These developments place parklands and open space in close proximity to the people. A good example of the former is the Independence Commons residential development in Farmington Township, Oakland County, Michigan.

To date, however, zoning in this country has not provided a long-term management tool for limiting land uses, particularly in nonurban areas. As a controlling procedure, zoning can prove itself more effective with strong State-level initiative, especially when used in combination with fee acquisition, leasing, and easements. Wisconsin, Minnesota, and Michigan have only recently established programs requiring counties to adopt shoreline and flood plain ordinances. Indiana has proposed similar legislation.

Time and space zoning can be applied to water surfaces to reduce conflicts among various uses and to provide greater utility of available surfaces. The increase in needs for water surface, especially near urban areas, is too great to be satisfied through development of additional water impoundments. Time zoning either limits the amounts of time that all or part of a body of water may be used for certain recreational activities or limits the length of time during which an individual or group of individuals can participate in a given activity. Space zoning limits the space available for a given activity at any given time. Intensive application of zoning techniques can, in this way, substantially increase the amount of activities which existing water surface areas can accommodate.

4.5.2.8 Environmental Impact

When any new recreational development is being considered, the consequences of such development on the environment of the area

must be weighed. Development of recreational facilities can result in either favorable or adverse effects on the immediate environment over a short or long period of time. For example, development of intensive-use facilities in heavily wooded areas over long periods of time will result in soil compaction which may severely damage the trees. Therefore, the potential impact of any proposed recreational development on the environment should be carefully analyzed and considered before that project is authorized for construction.

4.5.3 Funding

Inadequacy of funds for planning, acquisition, and development limits expansion of recreational opportunities. Competition for a share of the tax dollar with education, roads, pollution control, and other public-supported endeavors has restricted many ambitious recreational programs.

4.5.3.1 Acquisition Funds

Federal financial assistance is necessary to alleviate some of the burden associated with fee acquisition of urban lands for recreational use. Several Federal programs are designed to help State and local governments with land acquisition.

(1) Open Space Land Program (Department of Housing and Urban Development) is primarily designed to increase the supply of park lands and open space in urban areas.

(2) Model Cities Program (Department of Housing and Urban Development) enables designated cities to obtain extra money which may be used for parks and other projects that will improve the physical environment.

(3) Land and Water Conservation Fund (Bureau of Outdoor Recreation, U.S. Department of the Interior) provides matching grants for the acquisition of both urban and rural outdoor areas and parks in blighted city neighborhoods. Effectiveness of LWCF has been limited in urban situations because of the restraints placed upon it with respect to indoor recreation facilities. The future, however, may eventually see LWCF used for such facilities.

Rising land costs and increasing land-use competition create advantages to land-use control without fee acquisition. Easements, deed restrictions, and life tenancy clauses are examples of less-than-fee acquisition that could guarantee public access for low density activities (i.e., hunting, fishing, and hiking) as well as providing buffers for recreational development from adjacent incompatible land uses. At present, Wisconsin has a 25-year leasing program for public hunting and fishing purposes and a successful program for leasing scenic easement rights. In Pennsylvania, the Department of Environmental Resources and all counties have authority to purchase privately owned lands, to place restrictive convenants thereon, and to resell that land. The National Park Service and U.S. Forest Service are also using the less-than-fee acquisition concept in certain areas (i.e., along privately owned segments of a wild or scenic river). Primary advantages to land-use control without fee acquisition include reductions in land and management cost provisions where recreation is combined with other land uses, such as agriculture or timber production, and arrangements that would protect the attractiveness of the landscape without needlessly restricting its use to recreation. Land owners can be compensated for such agreements by offering tax rebates, a percent of user fees, or other incentives.

4.5.3.2 Development Funds

Federal financial assistance is available to State and local governments for planning, acquisition, and development of recreational lands. Sources of such funding, in addition to development funds associated with those programs mentioned above in relation to land acquisition, include:

(1) Urban Beautification Program (Department of Housing and Urban Development)—pays for park benches, walkways, landscapes, and similar facilities to beautify publicly owned lands.

(2) Elementary and Secondary Education Act, Section III (U.S. Office of Education, Department of Health, Education, and Welfare)—assists local school districts in providing recreational facilities and services.

A closer look at the Bureau of Outdoor Recreation's Land and Water Conservation Fund program will perhaps indicate the magnitude of Federal expenditure in the Great Lakes Region. Assistance for planning, acquisition, and development on a 50–50 matching basis amounted to $143,192,745 to the eight Basin States during a seven-year period from 1965 through 1971. In fiscal 1971, authorized apportionments amounted to nearly $61 million. Individual State apportionments ranged from a low of $2,873,747 for Wisconsin to a high of $12,978,000 for New York, as indicated in Table 21–18.

Appropriations for planning, acquisition, and development have also been stimulated at State and local levels. For instance, New York passed a $200 million developmental bond issue for park and marina facilities in 1966, as well as a $100 million land acquisition bond issue. Furthermore, Statewide outdoor recreation bond issues have provided $50 million in Ohio, $100 million in Michigan, and $200 million in Wisconsin since 1968.

At the local level, funding problems are especially acute in and near large metropolitan areas. For example, the City of Detroit is experiencing a financial squeeze, limiting its potential to adequately finance recreational development. Although the State of Michigan has proposed to invest more than $44 million in recreational facilities during the 1968–1977 period in an area roughly approximating Planning Subarea 4.1, the need for additional facilities will remain.

4.5.4 Access

The degree of resource accessibility is important in meeting recreational needs. Access improvement and access restrictions must both be considered if the Region's recreational needs are to be met without resource depreciation.

4.5.4.1 Access to Day-Use and Weekend-Use Facilities

Emphasis on resource-oriented parks in relatively inaccessible areas must be replaced by greater emphasis on day-use and weekend-use facilities close to urban populations. Even when such facilities are adequately provided, the accessibility question is not completely resolved. Access presents no problem for those with sufficient income and mobility. But for the poor, the old, and the less mobile living in the inner-city, tot lots, playfields, and neighborhood parks could be supplemented by subsidized rail and highway transportation to regional recreation areas.

While such a transportation program could alleviate some inner-city needs, it could also create additional pressures on both recreational resources and highways. Recreation-oriented weekend traffic has reached alarming peaks in some areas. Desirable as some distant resources may be, highway congestion en route can greatly reduce the pleasure and value of the trip. Building more highways may not be the best solution to ground transportation problems. Mass transit is one possible link between cities and resource areas that have the capacity to handle large numbers of people.

4.5.4.2 Unbalanced Pressure on Parks

Mass transit systems and modern highways could make remote recreational areas in the Region accessible for weekend use, leading many recreationists to bypass other resources that could furnish the desired activities. This could contribute to the depreciation of less common recreational resources and experiences.

What appears to be a compulsion to see the "best" opportunities at the end of the highway has already created unnecessary highway traffic and unbalanced pressure on certain parks (Figure 21–50). In effect, increased accessibility brought about by transportation technology may have to be offset by administratively controlled access in some areas and additional facility development in other areas. Perhaps local governments can provide such assistance by developing and publicizing more local facilities.

TABLE 21–18 Apportionments to Great Lakes Region States from the Land and Water Conservation Fund

State	1965	1966	1967	1968	1969	1970	1971	Total
Illinois	378,725	3,136,401	2,104,901	2,274,488	1,674,609	2,292,094	10,376,767	22,237,985
Indiana	210,277	1,774,048	1,189,678	1,294,694	958,759	1,268,122	3,604,191	10,299,769
Michigan	303,662	2,723,567	1,808,119	1,945,755	1,463,526	1,978,810	7,495,481	17,718,920
Minnesota	183,119	1,495,630	1,018,077	1,131,512	814,419	1,131,799	2,933,728	8,768,284
New York	601,610	4,928,780	3,382,451	3,652,786	2,483,393	3,539,961	12,978,000	31,566,981
Ohio	357,056	2,845,872	1,922,714	2,085,425	1,521,010	2,114,315	9,132,398	19,978,790
Pennsylvania	391,206	3,249,806	2,133,573	2,424,110	1,600,340	2,337,671	11,263,963	23,400,678
Wisconsin	194,669	1,645,578	1,109,716	1,231,721	912,137	1,523,770	2,873,747	9,221,338
Total	2,620,324	21,799,682	14,669,229	16,040,491	11,428,202	15,916,542	60,718,275	143,192,745

4.5.4.3 Off-the-Highway Vehicles

Off-the-highway vehicle innovations have also increased resource accessibility while creating new management problems. Interest in snowmobiles, all-terrain vehicles, and trail bikes has mushroomed overnight. Their use has provided access to and enjoyment of many formerly inaccessible areas. In 1970, for example, nearly 455,000 snowmobiles were registered in Michigan, Wisconsin, Minnesota, New York, and Pennsylvania.[25] These States do not require registration of machines used only on private lands or by public agencies. Assuming that 75 percent of all snowmobiles in these States are registered it is estimated that there were nearly 570,000 in 1970.

Indiscriminate use, however, results in damage to young trees and wildlife, excessive noise, severe soil erosion, and a mode of transportation for vandalism and theft in cottages. A number of Michigan's sand dunes and their associated vegetative cover have been seriously altered or destroyed by heavy use of all-terrain vehicles. It is recommended that certain dune areas be identified and preserved by banning or restricting these vehicles. Examples of such action can be found in Wisconsin where parks are being provided for motorized vehicle use, and in Indiana where snowmobiles and other motorized vehicles are prohibited in State parks. In 1967, 4,000 miles of designated snowmobile trails were available in Michigan, 3,000 miles in Minnesota, and 6,000 miles in Wisconsin. As noted in Section 3, the 1970 Michigan Outdoor Recreation Plan reported nearly 9,000 miles of snowmobile trails in that State.

4.5.4.4 User Distribution in Time and Space

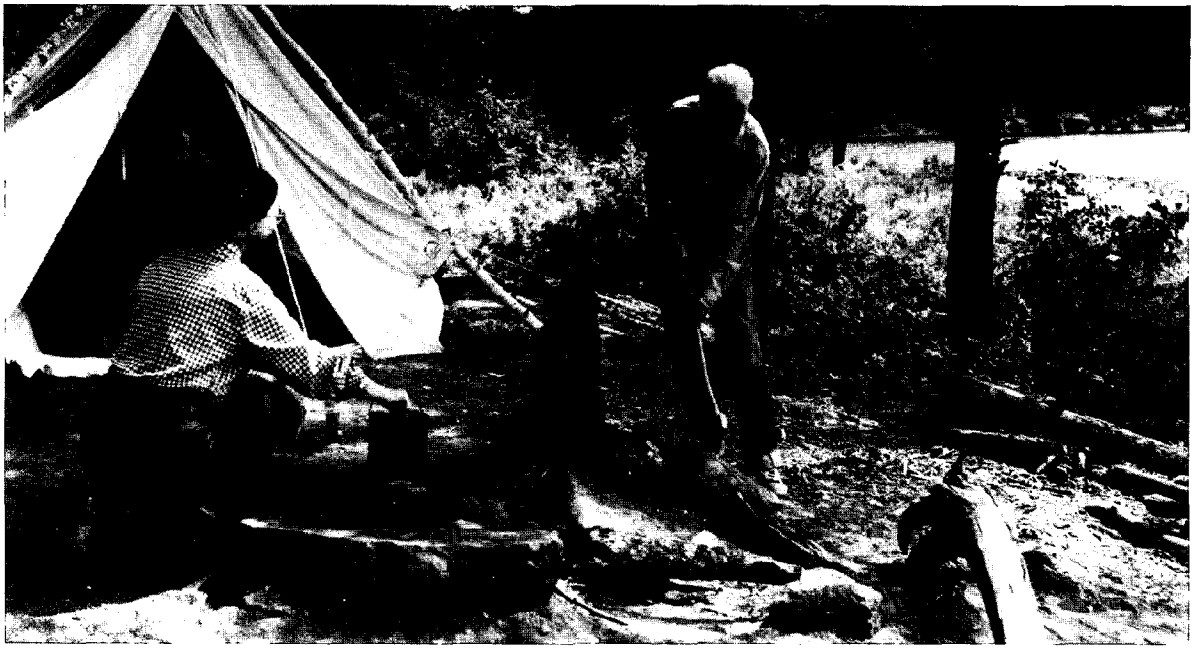
Related to resource accessibility is user distribution in time and space. If, for example, the four-day work week became common to many businesses and industries, the additional free time available to people could result in increased per capita demand for recreational opportunities. An increase of recreational pressures on lands, water, and facilities would follow. On the other hand, a four-day work week designed to maximize a company's use of its plant and equipment would also tend to distribute recreational demand beyond the traditional two- or three-day weekend. If staggered working days are adopted, it could become difficult for a family with two employed persons and children in school to find a "weekend" for recreation.

Consideration of alterations in traditional scheduling is not exclusive to industry. A 12-month school year has been considered by many school districts. It would not only alter the vacation season, but also change summer day-use and weekend-use patterns.

The spatial distribution of recreationists must also be considered. Many areas within the Great Lakes Region are overused, while other areas in and adjacent to the Region receive relatively little use (Figure 21–51). Such unbalanced distribution has adverse effects

Courtesy of Michigan Department of Natural Resources

FIGURE 21–50 Pressure on Recreation Facilities. The compulsion to see the best opportunities has created extreme pressures on certain recreational resources.

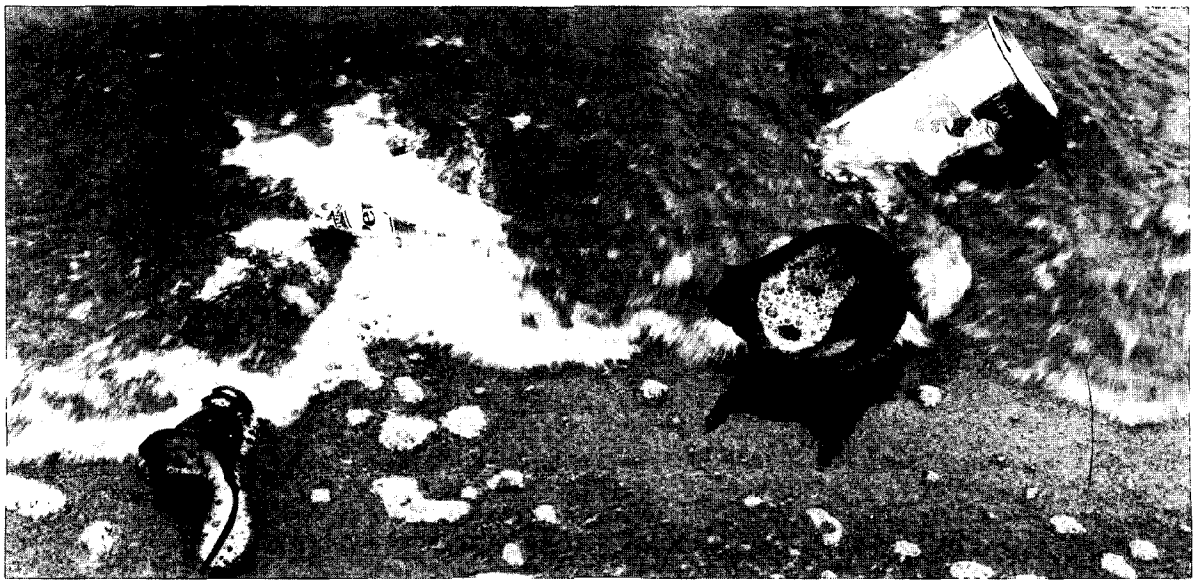


Courtesy of U.S. Forest Service

Wisconsin Department of Natural Resources

Bureau of Outdoor Recreation

FIGURE 21–51 Limited Use vs. Overuse. How much use can an area support without destroying or detracting from the wilderness environment?



on the quality of the environment and the quality of the experience in any given area. Transfer of recreational requirements from areas of heavy use to areas of light use must be promoted.

Alternatives that have been considered in the Boundary Waters Canoe Area to alleviate unbalanced distribution include: limiting the size of parties; assigning campsites; requiring advance user reservations; limiting total numbers of people; reducing motorized use; rotating facility use; and limiting the length of stay for each party.[44]

4.5.4.5 Access to Privately Owned Lands

Because 80 percent of the lands are privately owned, many recreational resources cannot be used because of access denial. In the past, laws which held the landowner responsible in liability lawsuits resulted in fenced property with "No Trespassing" signs (Figure 21–52). Now all States in the Great Lakes Region have passed landowner liability relief laws. However, many "No Trespassing" signs still remain, either because of the desire for privacy, public abuse of private lands, or lack of knowledge about the liability relief laws. Also, these laws generally do not cover private lands when use by the public is invited and encouraged. In short, laws have not encouraged the development of private land for public recreation.

Railroads and highways also limit access to water areas. Eliminating their barrier effect through improved design would help to provide access to water and adjacent land areas. Wisconsin, for example, has a program designed to provide public access to lakes and streams.

4.5.5 Resource Improvement

The quality of an outdoor recreation experience is very much influenced by the quality of the resource. Wherever natural or man-made contaminants have been dumped onto the land, into the water, or into the air, the capability of that resource to help meet the recreational needs is reduced. Individual preferences and varying definitions of quality make an analytical assessment of its intangible aspects difficult. A crowded beach may be seen as a desirable recreational area by some while others would shun such an experience.

4.5.5.1 Water Quality

Agricultural, industrial, domestic, and even recreational enterprises have operated as if lakes and streams were public dumping grounds for every conceivable type of waste (Figures 21–53 and 21–54). The list includes

Courtesy of Michigan Department of Natural Resources

FIGURE 21–52 Limitation to Public Use. Fences and no trespassing signs limit the use of land and water areas that would otherwise be available for public use.

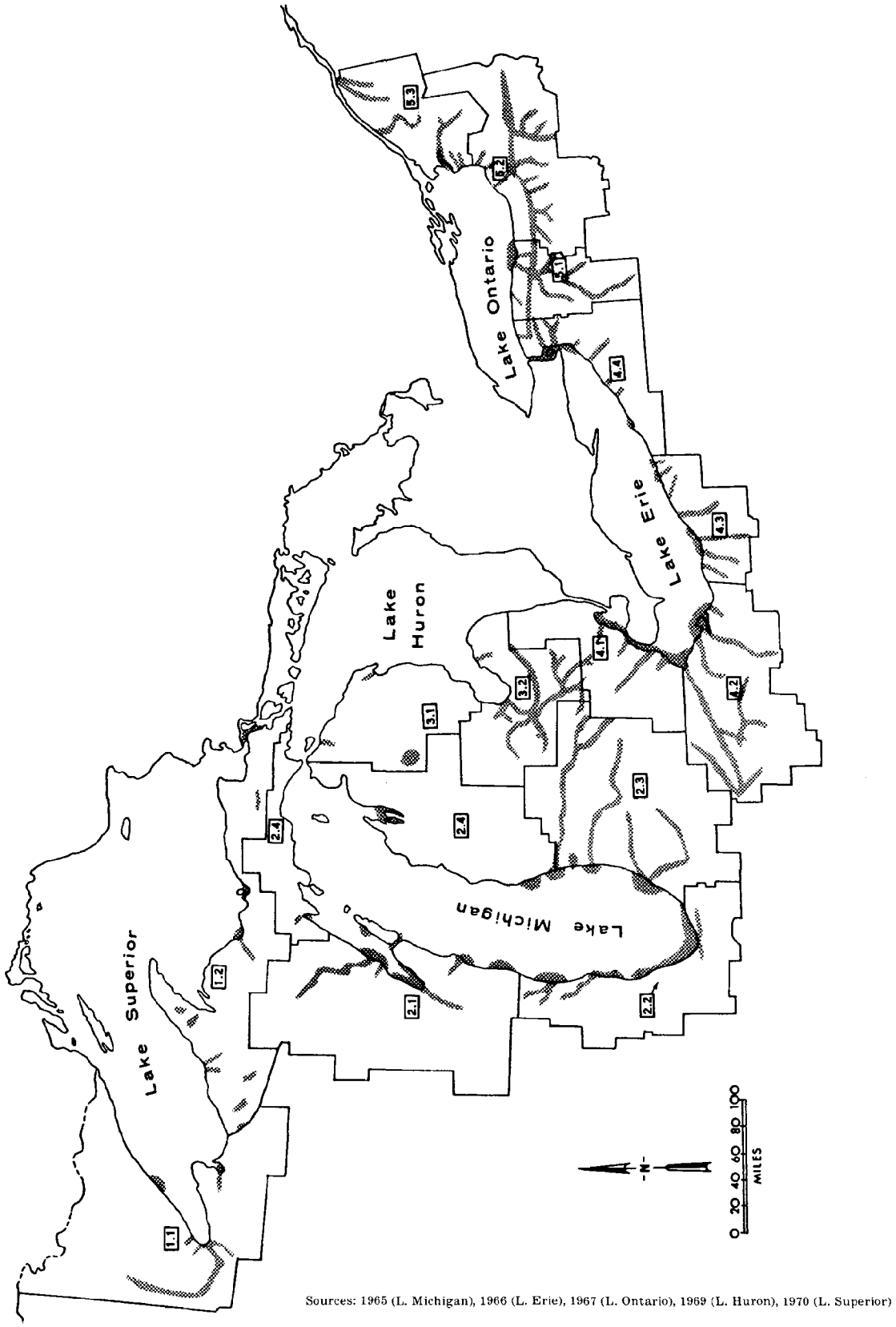
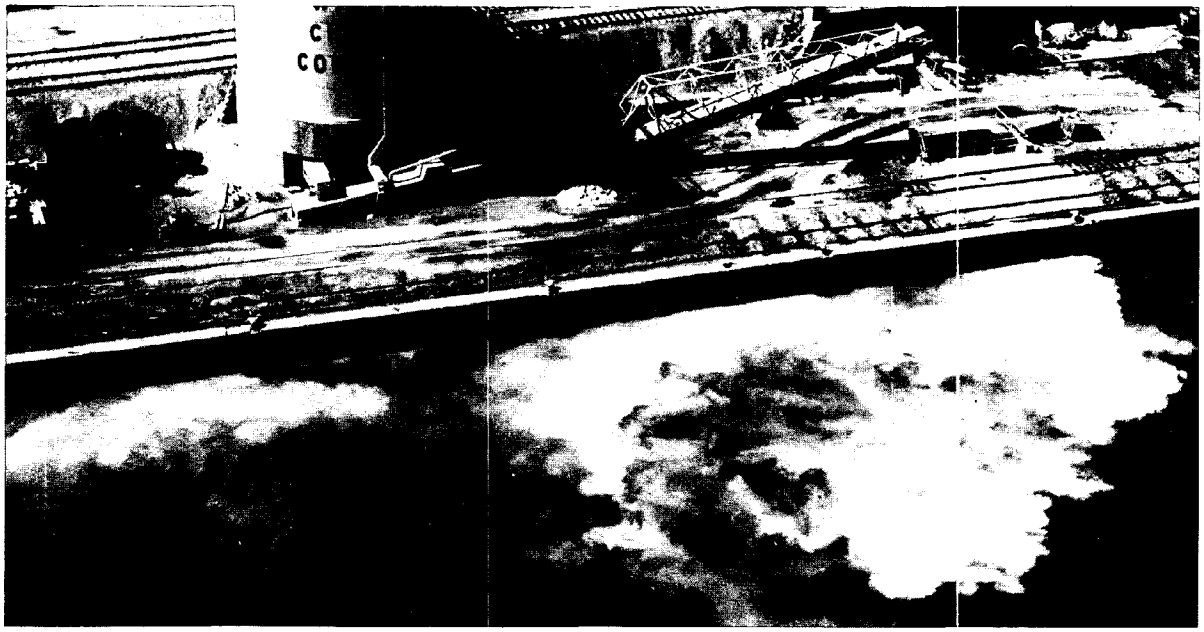


FIGURE 21–53 Waters Impaired by Low Quality. The degree to which water quality is impaired on each river and lake can be found in Annex F.

phosphorus, nitrogen, and pesticides from agricultural sources, toxic metals from industrial sources, human wastes from improperly equipped cottages and watercraft, and uncontrolled thermal pollution from nuclear and fossil fuel power plants. It is believed that the inflow of nutrients, especially phosphorus and nitrogen, into Great Lakes water is largely responsible for algal growth. The chief source of these nutrients is inadequately treated sewage from urban areas, large agricultural feedlots, and runoff from agricultural lands. Very little sewage receives tertiary treatment to remove these nutrients. Drainage waters carrying nitrogen in solution and phosphorus attached to particles of sediment provide a large and constant source of nutrients. The closing of Lake St. Clair to sport fishing as a result of mercury contamination illustrates the incompatibility of untreated industrial

Courtesy of Wisconsin Department of Natural Resources



Courtesy of Michigan Department of Natural Resources

FIGURE 21–54 Waste Disposal, Great Lakes Style

wastes and water-oriented recreational activities.

Deterioration of water quality has resulted in the classification of large portions of the Region's streams and lakes according to the following scale:

(1) lightly impaired, whole body contact allowed, but nearby mining, canning, sewage treatment, or similar activities may inhibit an aesthetically pleasing environment

(2) moderately impaired, water suitable for partial body contact activities, but whole body contact is prohibited

(3) grossly impaired, recreation prohibited because of algal growth, dead fish, oil slicks, floating debris, raw sewage, or other similar conditions

Figure 21–53 shows the location of major bodies of water that have been classified as impaired by 1965, 1966, 1967, 1969, and 1970 Bureau of Outdoor Recreation reports (see references 60, 61, 62, 63, and 64).

In 1961, the waters of Sterling Beach in Sterling State Park, located on Lake Erie between Detroit and Toledo, were posted as unsafe for full body contact.[27] In 1967 approximately 116 acres of Great Lakes beaches were closed because of indiscriminate water pollution. By 1970, the situation had not improved. A January 11, 1971, Environmental Protection Agency news release stated that numerous beaches in the Milwaukee, Chicago, Toledo, Cleveland, Buffalo, and Ithaca areas had been posted as polluted. It also indicated that "deterioration of Lake Erie water quality has cost the Erie, Pennsylvania, area approximately $13 million a year in tourist trade. The closing of six beaches in the Lake Ontario basin in 1969 resulted in an estimated economic loss of $1,900,000."[65]

4.5.5.2 Soil Erosion and Sedimentation

Excessive quantities of soil are being eroded from agricultural land, housing developments, industrial sites, street and highway construction routes, and recreational areas. The resulting sediment clogs storm sewers and silts streams, lakes, and reservoirs, adversely affecting water quality, fish, and wildlife. The process commonly limits the use of water for most purposes, including water-oriented recreation.

Control of soil erosion and sedimentation has long been recognized as essential for the protection of our valuable water and land resources. Until recently, however, only limited controls had been put into effect; even now few regulations have been imposed. Some local governments have enacted building and construction ordinances which contain provisions for the control of soil erosion and sedimentation. These controls vary greatly in effectiveness. But local governments are hesitant to enact strong regulatory ordinances because they fear discouragement of development that could provide additional tax revenues to the community.

For control of soil erosion and sedimentation, the following actions are suggested:

(1) require the preparation of soil erosion and sedimentation control programs

(2) require local governments to enact building and construction ordinances containing soil erosion and sedimentation control provisions within guidelines and specifications set forth in the aforementioned programs

(3) require land users and developers to control excessive soil erosion and sedimentation

(4) provide a State agency backup, if necessary, to ensure that local governments adequately promulgate and enforce soil erosion and sedimentation controls

4.5.5.3 Dredging, Filling, and Disposal of Dredge Spoil

Many problems caused by unregulated filling and dredging of lakes and streams are now effectively controlled. A problem still exists, however, in annual maintenance dredging of Federal commercial and recreational harbors, especially when polluted dredge spoil is involved.

Annual dredging is required in many deep-water and recreational harbors to ensure adequate depth for navigation. When harbors contain polluted bottom sediments, disposal is a problem. Past practice has been to dispose of all dredge spoil in designated dumping grounds in the open Lakes, often in areas where polluted material could contaminate public swimming areas near the harbors in question. Complicating the matter is the problem of finding suitable land disposal sites for polluted dredge spoil since they are both scarce and expensive.

According to the conclusions of a U.S. Army Corps of Engineers Pilot Study:[47]

(1) Alternative methods for disposal of polluted dredging spoil consistent with current pollution control goals and programs are

necessary. The present practice of open lake spoil disposal should be discontinued.

(2) Determination of the nature and degree of pollution of dredging spoil and the necessity for alternative disposal should be made jointly by the Federal Environmental Protection Agency and the appropriate State pollution control agency.

(3) Selection of alternate disposal sites for dredging spoil should be a joint Federal-State responsibility.

(4) The additional cost of dredging spoil disposal should be a project cost. Where nonnavigational benefits are created (such as land reclamation or recreational enhancement), the additional cost of disposal should be subject to reimbursement.

(5) An action program of alternate dredging spoil disposal should be implemented immediately.

(6) Support should be given any pending Federal legislation encompassing these recommendations.

4.5.5.4 Thermal Pollution

Because thermonuclear generating plants must be near large volumes of water, some Great Lakes shoreland is being used for this purpose. As demands for power increase, cooling water from such plants is causing much controversy. It is not yet known what effect, if any, discharged cooling water may have on the overall ecology of the Great Lakes. A longstanding controversy on minimum standards for such discharges has added to the problems associated with the 16 existing and proposed nuclear power plants—three on Lake Ontario, ten on Lake Michigan, and three on Lake Erie. There are also strong objections to the nonaesthetic appearance of cooling towers, transmission lines and other plant facilities.

The encroachment of power plants on the Great Lakes shoreline has generally had a detrimental effect upon shoreland recreational opportunities. Increased coordination among planners, engineers, and ecologists in the location and design of power plants could substantially reduce such conflicts. Cooling ponds or lakes and land adjacent to power generating plants can be used for boating, fishing, water-skiing, picnicking, and camping. In addition, the large, undeveloped "exclusion areas" of nuclear plants may used for hunting, fishing, and picnicking under existing Federal regulations. Some power companies are building visitor centers at nuclear plant sites, thus encouraging tourism.

Utility companies note that thermal discharges of power plants would warm small sections of the frequently cold water of the Great Lakes, increasing the recreational value for swimmers. However, this potential cannot be realized until a thorough study is made of the overall impact of warm water discharges upon the lake environment.

4.5.5.5 Shoreland Development

Use and development problems (Figure 21–55) generally become more intense on inland lakes because of the limits imposed by their size. Overdevelopment, accelerated eutrophication, use conflicts, filling and dredging, and pollution are becoming more prevalent as lakes become more intensively developed.

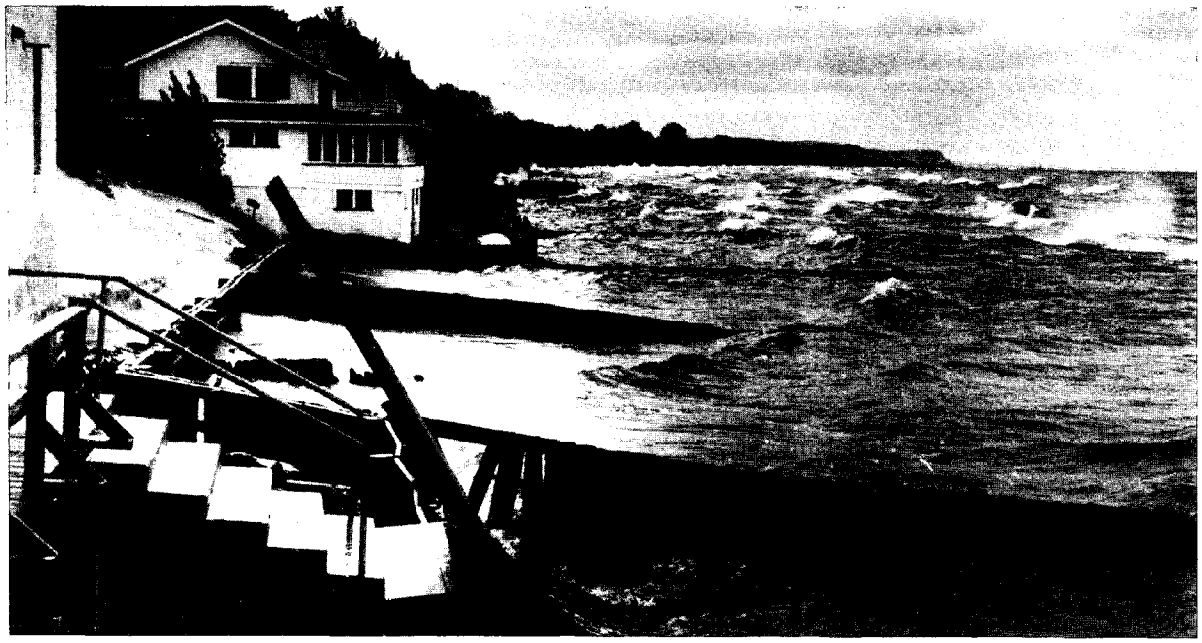
The Great Lakes Region has thousands of inland lakes ranging from a few to thousands of acres in size. Their use for recreation, navigation, water supply, and the development of their shorelands has been heavy and will continue to expand in the years to come.

Little thought was given to planning for the use and development of lakeshores in the past. Now there is great need for comprehensive planning and management of inland lakes to ensure proper future use and development.

Legislative programs similar to those now being implemented for shorelands protection and management in some States should be developed for inland lakes in all States. Certain controls over use and development of inland lakes could effectively minimize existing conflicts and problems and assure a controlled management program for future lake use and development. Wisconsin's shoreland zoning measures, for instance, now require buildings to be a minimum of 75 feet from the lake, lots at least 100 feet wide, and a 50-foot setback of tile fields. The zoning measures also prohibit building in lowlands.[73]

4.5.5.6 Sanitary Landfills and Solid Waste Disposal

The disposal of solid wastes, whether household rubbish or junk automobiles, is becoming an ever-increasing problem as our population expands. Too often, high quality or potentially high quality shorelands and other natural areas are used for solid waste disposal and sanitary landfills. Through recycling,



Courtesy of U.S. Army Corps of Engineers

FIGURE 21–55 Shoreland Development. Intensive development on shorelands precludes public use of such land and makes it highly susceptible to storm damage.

wastes become resources. Governmental support is needed for research in this area. Adequate land areas for use as disposal sites for wastes which cannot be recycled are becoming increasingly difficult to acquire. Sanitary landfills and other solid waste disposal sites, even in areas well suited for such activities, are often met with considerable opposition from adjoining property owners and others. Consequently, alternative locations are often found along shorelines and other relatively undeveloped areas having recreational potential. Sanitary landfills adjoining watercourses also may contribute to water pollution through seepage.

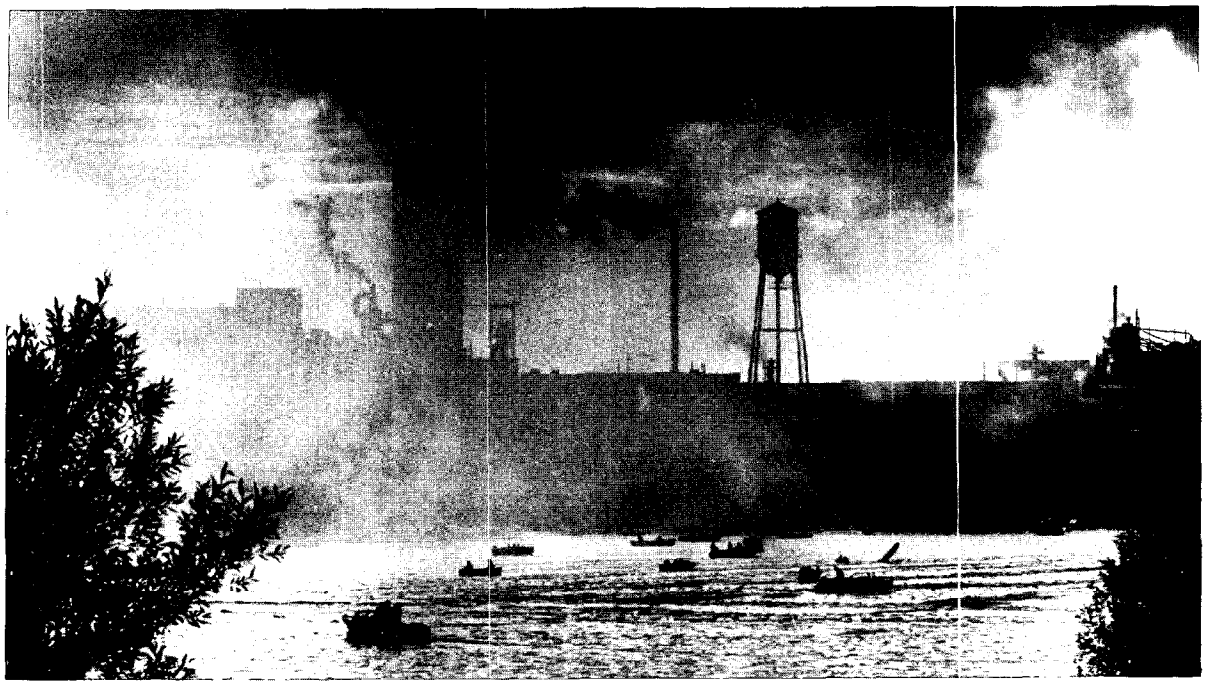
Upon completion, the recreational potential of a sanitary landfill can and should be realized through soil stabilization techniques, beautification projects, and functional landscape design and development.

4.5.5.7 Recreational Watercraft Wastes

Boaters have also contributed to water pollution through watercraft wastes. To alleviate this problem, Chicago has passed an ordinance that requires watercraft using the Lake Michigan harbor area to be equipped with holding tanks for onshore disposal. Minnesota, Michigan, Wisconsin, New York, Indiana, and Illinois have legislation prohibiting the discharge of sanitary wastes from recreational watercraft into the Great Lakes; Michigan and Indiana's legislation includes commercial vessels. At the Federal level, the Water Quality Improvement Act of 1970 incorporated provisions for control of sewage from vessels on navigable waters. Section 13 (b) of the Act states, "As soon as possible [the government] shall promulgate federal standards of performance for marine sanitation devices. . . ."[51] These and other strong pollution control measures can result in increasing recreational opportunities in critical areas of unsatisfied demands.

4.5.5.8 Great Lakes Shoreland Erosion

Wave action, underground seepage, surface-water runoff, and frost and ice action are strong erosional forces that damage the Great Lakes shoreline. Between Kenosha and Milwaukee, Wisconsin, an estimated three and a half feet of property is eroded annually into Lake Michigan. Since the late 1930s, property lines have receded 195 feet in the South Haven area of Michigan, replacing a sandy beach with a 60- to 70-foot bluff. Early in



Courtesy of Michigan Department of Natural Resources

FIGURE 21–56 Air Pollution. Air pollution is common in many Great Lakes cities.

1971, 20 acres of the Sleeping Bear Dunes crumbled into Lake Michigan.[18] High waters have obliterated sandy beaches, created swamps, and covered boat livery docks built in low-water years.

To alleviate shoreland erosion problems, Appendix 12, *Shore Use and Erosion*, refers to three broad alternatives: protection through zoning of the shorelands, protection through construction of shore erosion control structures, and protection through control of lake levels.

4.5.5.9 Air Pollution

Undesirable contaminants in the air also adversely affect the quality of an outdoor recreational experience (Figure 21–56). As one of the most heavily industralized and populated areas of the country, the Great Lakes Region produces tremendous amounts of pollutant particles (fly ash, soot, and lead), and gases (sulfur dioxide, carbon monoxide, and various oxides of nitrogen). Sources include automobiles, manufacturing complexes, power plants, and backyard incinerators.

The sources of air pollutants have not significantly changed from past decades. In recent years, industries have been forced to invest millions of dollars in air pollution control systems, and laws have been enacted to control the design, installation, and operation of home incinerators. Outdoor leaf and rubbish burning has been banned in many areas, and fly ash scrubbers on sludge furnaces of municipal sewage treatment plants have been installed. The Clean Air Amendments of 1970 became law (Public Law 91–604) on December 31, 1970, regulating emissions from vehicles and stationary sources.[53]

Unstable air masses flowing across the Region in a west-to-east direction sweep most unhealthy air pollutants eastward. However, for short periods of time, undesirable airborne contaminants may remain over a heavily populated area, endangering the health of its residents, especially those engaged in strenuous recreational activities. Stronger legislation is needed to combat all air pollution.

4.5.6 Program Improvement

Use and enjoyment of recreational resources and facilities are influenced by the effectiveness of Federal, State and local policies.

4.5.6.1 Multiple-Activity Compatibility

Management of the Region's recreational resources is complicated in some areas by the use of two or more incompatible activities on such resources. Incompatible activities must be adequately considered in any comprehensive recreation plan. One example is the conflict between canoeists and trout fishermen on some of the Region's streams, including the AuSable River of Michigan. Because stream mileage is not adequate to meet the needs of both groups simultaneously, management plans could possibly resolve conflicts of interest and provide the basis for satisfactory experiences by both groups. The same can be said of swimming and fishing, hiking and cycling, snowmobiling and cross-country skiing, sailing and power boating, and other incompatible activities. To alleviate conflicts, the possibilities of restricting use to certain areas and periods of time, as well as limiting the number of users, should be considered.

4.5.6.2 Program and Area Supervision

Within an urban area, a park and recreation program cannot completely meet resident recreational needs unless there are personnel to supervise programs and areas. Overflowing wastebaskets, broken glass, ruined shrubs and flowerbeds, mutilated benches and defaced statues and building walls have turned some parks and recreational areas into slums. Sidewalks and streets have therefore become play areas even when public recreational facilities are available. In addition land allocations often stress sports and playground programs, and ignore the cultural, artistic, and creative needs of the community.

4.5.6.3 Educational Programs

Environmental awareness is now significant in our educational system. The Environmental Education Act passed by the U.S. Congress in October 1970 encourages the development of new environmental educational programs, training of educators and community leaders in many different areas, dissemination of educational information for use in such programs, and establishment of outdoor ecological study centers. As quality recreational resources diminish, a general appreciation for the environment must be developed by all individuals if good recreational opportunities are to be available in the future.

Environmental awareness has only recently become a serious element in most recreational planning and development. In the past too little attention has been given to evaluating the impact of recreational use and development on the natural environment. Planning based on a real understanding of the complex environmental relationships is needed today.

4.5.6.4 Government-Citizen Involvement

Effective use of lands and funds at the project level is influenced by government-citizen communication. While additional money to support traditional park and recreational facilities and programs is necessary, adequately allocated resources must be coupled with neighborhood involvement in the planning and decision-making process. An excellent example of government-citizen cooperation can be found in Detroit. Following the 1967 riots, Deprived Area Recreation Team (DART) was established to give residents a part in the planning of recreational facilities most suited to them. Major lines of communication have since been established between inner-city groups and affiliates. Workshops have been established to make citizens more aware of Federal and State aid, and effort is being made to provide recreational facilities in neighborhoods lacking them.[55]

4.5.7 Planning

Many problems in providing local recreational opportunities result from insufficient planning on a scale to analyze adequately issues and to develop solutions. Municipal, township, and even county planning bodies are too narrow in scope to consider adequately the impact of their citizens on localities outside of their boundaries, or the impact of people from other places on their areas of responsibility. These problems are not specific to recreation alone, they are common to most uses of land and water resources in such urban areas. In a number of States in the Great Lakes Region there is need for State legislation to establish regional planning authorities, such as the Southeastern Wisconsin Regional Planning Commission and the Northeastern Illinois Planning Commission, to provide for planning on a regional scale.

These commissions have the capacity to analyze the needs of the entire metropolitan area and to examine the capacity of available resources to meet those needs, not only for recreation but for all uses of land and water.

4.6 Specific Features of the Plan

A discussion of the needs, specific problems, alternatives, and a general plan are set forth for each of the planning subareas. The preceding discussions of objectives, responsibilities, programs, problems, and alternatives are applicable to all of the planning subareas, and, therefore, are not repeated.

Subsequent subsections on plan design discuss elements proposed for recreational development for each of the planning subareas and give a general priority rating which can be changed according to the development of needs. However, priorities for certain elements are critical because if they are not acquired in the near future, they may not be available at a later time.

4.6.1 Planning Subarea 1.1

This planning subarea includes the portion of Minnesota along the north shore of Lake Superior and the portion of Wisconsin on its south shore. Approximately 50 percent of the effective population is derived from urban sources and only one SMSA, Duluth-Superior, is found within the area. The eight counties of this planning subarea contain many high quality recreational resources, including the Boundary Waters Canoe Area (administered by the U.S. Forest Service), extensive forests, a multitude of lakes and streams, topography which lends itself to winter sports, and an exceptionally attractive Lake Superior shoreline.

There are approximately 5,175,000 acres available for recreation in this planning subarea. Of this total, more than 4.1 million acres are in national, State, or county forests, and more than 40,000 acres in State and local parks. The acreage of Great Lakes and inland waters considered usable for recreation is approximately 325,000 and 506,000 acres, respectively.

The northern portions of St. Louis County and Lake County, Minnesota, were included in both the *Great Lakes Basin Framework Study* and the *Souris-Red-Rainy River Basins Comprehensive Study*. Therefore, the same facilities are involved in meeting the recreational requirements of two different planning areas. The recreational needs of both the Rainy River basin and Planning Subarea 1.1 are slightly greater than indicated in the two comprehensive studies, because the two planning areas have a surplus of recreational opportunities in the overlapping area. This error, however, is considered so small that it has little if any effect upon acquisition and development plans.

Total annual recreational requirements of Planning Subarea 1.1 for 1970 were estimated at nearly 10 million recreation days. By 2020 these demands are estimated to approach 24 million recreation days. Water-oriented recreational requirements were estimated to be almost three million in 1970, and are expected to reach more than seven million recreation days by 2020.

4.6.1.1 Estimate of Needs

On examining Table 21–19, it is apparent that there are no new acreage needs for several activities through the year 2020, and that only moderate amounts are needed for the remaining activities. This is due to a methodology that does not adequately consider the impact of directional travel patterns. Many urban dwellers are willing to travel more than 150 miles for overnight and weekend use to use high-quality resources, and will travel in certain directions in much greater numbers than they will in other directions. Because the magnitude of this directional pattern from urban centers is unknown, adequate supporting data were unavailable. Therefore, the methodology used in this study did not properly weigh the impact of recreational requirements on this planning subarea.

The importation of recreational demand to this area is much greater than that shown by the study data. Even though the study data show little or no need for various water-oriented activities, it is assumed that the data generated by the two States more accurately reflect the needs in this planning subarea. The water supply base in this area appears to be adequate to meet present and future demands for boating and related activities.

The Minnesota Outdoor Recreation Plan[28] states that there will be need for additional swimming, picnicking, camping, golf, trail, and boat launching facilities in the Minnesota portion of this planning subarea by 1980. The Wisconsin Outdoor Recreation Plan[71] shows

TABLE 21–19 Potential Recreational Development Areas in Wisconsin, Planning Subarea 1.1

Area	County	Total Acres	Acres Publicly Owned
Copper Falls	Ashland	1,800	1,400
Minersville	Ashland	6,500	4,600
Lake Owen	Bayfield	2,200	2,000
Drummond	Bayfield	5,000	5,000
Lake Superior	Bayfield	4,400	2,100
York Island	Bayfield	2,400	-----
Sand Island	Bayfield	1,300	1,300
Marengo River	Bayfield	1,900	600
Iron Range	Iron	6,200	4,000
Gile Flow	Iron	1,800	1,300
Potato River	Iron	400	400
Pattison State Park	Douglas	1,000	-----
Nemadji River	Douglas	2,100	1,900
Amnicon Falls	Douglas	1,200	700
St. Louis River	Douglas	1,300	-----
St. Croix River	Douglas	4,600	2,600

1980 needs for camping, golf, and trails in the four Wisconsin counties when State Planning Area Six is prorated to these counties on a native population basis.

Plan formulation will be based on the conclusion that a much larger portion of camping, boating, picnicking, swimming, and trail-oriented activities allocated to Planning Subareas 2.1 and 2.2, will be satisfied in Planning Subarea 1.1.

(1) Urban Land Needs

In an area where 32 percent of developed acreage needs were allocated to the urban sector, the greatest needs in 1970 were for playfields, golf courses, and more than 100 miles of bicycle trails. To satisfy the urban needs of this planning subarea, it was estimated that nearly 1,300 acres of additional developed lands were needed in 1970. By 2020, this need is expected to reach 9,400 acres (Table 21–19). In contrast, the 1969 Executive Summary for the Minnesota Outdoor Recreation Plan[29] stated that 3,600 acres would be needed for golf courses in the northeastern part of the State by 1980. Methodology for computation of Class I (urban) and Class II (nonurban) recreation lands is located in Annex E.

(2) Nonurban Land Needs

Total developed land needs for nonurban recreational areas amounted to 310 acres in 1970. This will increase to 580 acres in 1980, 1,420 acres in 2000, and 2,430 acres in 2020. It is estimated that 50 percent of these needs can be satisfied on existing publicly owned lands. The total need for new land amounted to 1,100 acres in 1970 and is expected to increase to 1,900 acres by 1980, 4,700 acres by 2000, and 8,100 acres by 2020. Since directional patterns of travel were not considered, such estimates may be low. The Minnesota State Recreation Plan for the State's Planning Area Three, which includes all of the Minnesota portion of Planning Subarea 1.1 of the Great Lakes Basin and Itasca County, set forth 1980 needs (exclusive of Itasca County) as follows: 110 acres of swimming beaches, 40 acres of camping, 1,000 acres of picnicking, 440 acres of boat launching sites, 250 miles of trails, and 3,200 acres of golf courses. After adjusting the Wisconsin Outdoor Recreation Plan Data for State Planning Area Six to include only the four counties in this planning subarea, a need for 220 acres of camping and a minor need for golf courses in 1980 was indicated. Surpluses of 175 acres for swimming beaches, 130 acres for picnicking, and 260 miles for trails were shown. The sum of the needs developed by the two States for their respective planning areas, adjusted to include only those counties in Planning Subarea 1.1, showed needs of 870 acres for picnicking, 260 acres for camping, and approximately 3,200 acres for golf courses. A surplus of 70 acres of swimming beach existed. However, surpluses for swimming beaches in one part of a planning subarea might not offset needs for such facilities in another part of that area.

(3) Total Land for Recreation

Combining urban and nonurban land demands, there was a need for the acquisition and development of more than 2,300 acres of recreational land in 1970. The total need for recreational land will reach nearly 18,000 acres by 2020 (Table 21–19).

In addition to the general objectives listed at the beginning of Section 4, recreation objectives specific to this planning subarea are:

(1) greater utilization of the recreation potential on Lake Superior and along its shores

(2) preservation and utilization of wilderness areas to the optimal capacity

4.6.1.2 Problems

In addition to the problems listed in Subsection 4.5, recreational difficulties include water levels too low for canoeing, overuse in the Boundary Waters Canoe Area (BWCA), adverse environmental impact of mining operations, and heavy dependence upon the tourist industry.

Canoeing on several streams outside the Boundary Waters Canoe Area is dependent upon the maintenance of low-head impoundment structures. There is a need to construct, repair, and reconstruct such structures in order to maintain water at previously established levels. This will contribute to control of BWCA use.

In 1969, approximately 113,000 people visited the BWCA. Most of them entered the area at six of the 78 access points and were concentrated along a few travel routes. Lime, a geographer with the North Central Forest Experiment Station, stated, "In these areas, use probably has not only decreased the quality of the experience for many visitors but may have deteriorated the environment as well."[17]

The controversial dumping of taconite wastes into Lake Superior at Silver Bay, Minnesota, has serious implications for fishermen, lakeside residents, conservationists, recreationists, and several government agencies.

Extensive mining operations have removed many millions of tons of iron ore in the Minnesota portion of this area. Recently, new mining operations have opened up vast areas of taconite ore accompanied by vast open pit excavations and huge piles of debris that greatly detract from the aesthetic qualities of the area.

The social and economic well-being of the Lake Superior area depends heavily upon the tourist industry. But the region's competition for the tourist dollar has been impeded by inadequate facilities, unavailability of credit for capital improvement, poor management practices, and inadequate efforts to promote tourism.

4.6.1.3 Suggestions for Future Action

Many, but not all, recreational land needs of Planning Subarea 1.1 can be met by increased development of existing public forests and parks and by acquisition of lands in and near the Duluth-Superior area.

Assuming an average optimal level of development of 15 percent on State park lands, 0.86 percent on national forests in Minnesota, and 0.66 percent on those in Wisconsin, approximately 30,000 acres in this planning subarea are available for intensive recreational development. Because of the present distribu-

TABLE 21-20 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 1.1

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	60	230	0	70	260	0	110	260	0	150	260	0
Picnicking	900	920	0	1,080	1,160	0	1,360	1,160	200	1,680	1,160	520
Camping	350	1,280	0	530	1,570	0	820	1,570	0	1,150	1,570	0
Parking (General)	120	150	0	150	150	0	210	150	60	280	150	130
Parking (Boats & Water-skiing)	180	140	40	260	190	70	380	190	190	520	190	330
Subtotal	1,610	2,720	40	2,090	3,330	70	2,880	3,330	450	3,780	3,330	980
Acres of Developed Land for Other Summer Activities												
Playfields	1,500	860	640	2,150	890	1,260	3,400	890	2,510	4,700	890	3,810
Golf	2,160	1,650	510	3,000	1,780	1,220	4,850	1,780	3,070	6,600	1,780	4,820
Subtotal	3,660	2,510	1,150	5,150	2,670	2,480	8,250	2,670	5,580	11,300	2,670	8,630
Acres of Developed Land for Winter Activities												
Snow Skiing	110	1,010	0	120	1,090	0	140	1,090	0	140	1,090	0
Sledding	190	0	190	230	0	230	340	0	340	500	0	500
Ice Skating	10	30	0	20	30	0	30	30	0	40	30	10
Subtotal	310	1,040	190	370	1,120	230	510	1,120	340	680	1,120	510
Total Acres of Developed Land	5,580	6,270	1,380	7,610	7,120	2,780	11,640	7,120	6,370	15,760	7,120	10,120
Acres of Water Surface												
Boating (including Canoeing, Sailing, & Water-skiing)	61,000	831,000	0	82,000	831,000	0	122,000	831,000	0	172,000	831,000	0
Miles of Trails												
Hiking & Nature Walks	140	710	0	200	770	0	290	770	0	420	770	0
Bicycling	140	30	110	160	30	130	200	30	170	250	30	220
Horseback Riding	60	300	0	70	320	0	90	320	0	150	320	0
Total Miles of Trail	340	1,040	110	430	1,120	130	580	1,120	170	820	1,120	220
Total Needs for New Lands for Recreation (Acres)												
Class I			1,270			2,720			6,150			9,600
Class II			1,070			1,940			4,740			8,130
Total Land Needs			2,340			4,660			10,890			17,730
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			130			230			1,500			3,260
Annual Requirements in Recreation Days												
For All Recreation Activities (1000s)	9,959			12,897			17,982			24,278		
For Water-Oriented Recreation Activities (1000s)	2,853			3,787			5,285			7,148		

tion of public lands, it was assumed that all Class I and 50 percent of Class II land needs will have to be met through acquisition. Acquisition will have to take place where there is insufficient potential for additional development on existing public lands, or where it is necessary to preserve high quality resources not now in public ownership.

To meet estimated recreational needs, the 1966 Wisconsin Outdoor Recreation Plan listed the following as recreational areas of special significance:

(1) Apostle Islands State Forest, Bayfield County—5,100 acres

(2) Bayfield Marina, Bayfield County

(3) Saxon Harbor, Iron County—100 acres

(4) Lake Minnesuing Recreation Area, Douglas County

In addition, the plan lists a $1,000,000 Lake Superior harbor project in the northeast corner of Douglas County; several other areas with potential for recreational development are listed in Table 21–20.

The State of Minnesota also lists proposed and potential recreation areas. Under a 10-year program recommended by the Minnesota Outdoor Recreation Resources Commission,[30] two State parks within the planning subarea will be increased in size; Baptism River State Park by 100 acres, and Judge C. R. Magney State Park by 3,200 acres.

Four potential canoe routes designated in 1963 and 12 additional routes named in 1967 are being studied in Minnesota. The Cloquet and St. Louis Rivers are near the Duluth-Superior SMSA. Fifteen of these 16 rivers have been recommended for study under the Minnesota Wild and Scenic Rivers Act of 1973. Development of these streams would benefit the Duluth-Superior population as well as people outside it.

Additional development is planned by the U.S. Forest Service in its two national forests, Superior (including the Boundary Waters Canoe Area) and Chequamegon.

There are several areas possessing nationally significant qualities which, once established, will also help meet the planning subarea's recreational needs. It should be stressed that the amount of development may be restricted by an area's purpose. Although State and local parks and recreational areas are established to provide outdoor recreation opportunities, national parks, monuments, lakeshores, and scenic rivers are established to preserve scenic, historic, cultural, and aesthetic qualities while permitting selected recreational activities under strict control. Within Planning Subarea 1.1 (Figure 21–57) proposed or authorized areas of national significance include the following:

(1) Apostle Islands National Lakeshore, a 42,000-acre area authorized by Congress in 1970 and consisting of two units, the Red Cliff Unit and the Apostle Island Unit

(2) Voyageurs National Park, an authorized addition to the National Park System encompassing about 219,000 acres, including 80,000 acres of water surface

(3) Grand Portage National Monument, a 12,644-acre proposed area extending 28.7 miles along the Lake Superior shoreline and encompassing 14 offshore islands (Figure 21–58)

(4) a portion of the proposed North Country Trail, the study of which was authorized by Public Law 90–543

4.6.1.4 Plan Design

Proposed recreational planning alternatives are set forth here as part of a broad overview framework, not a specific plan. More study and analysis will be required to determine the specific size and type of development needed for a detailed plan.

New lands will have to be acquired in and near urban areas throughout the planning subarea for much of the Class I type recreational development. Some urban needs could be satisfied through intensive development of existing public lands in close proximity to urban centers.

There are two alternatives for Class II type development. First, all existing publicly owned park land should be developed more intensively to provide additional recreational opportunities. Because the level of development on this land is presently quite low, expansion of facilities would not lead to overdevelopment. In addition, publicly owned forest lands should be used where feasible to provide recreational opportunities such as camping, swimming, boating, and trails.

Secondly, new lands will need to be acquired to satisfy recreational needs where opportunities are not now available or where there is a need to protect high-quality recreational resources from exploitation. The following elements are suggested for recreational development and should be given priority during the 1970–1980 time frame:

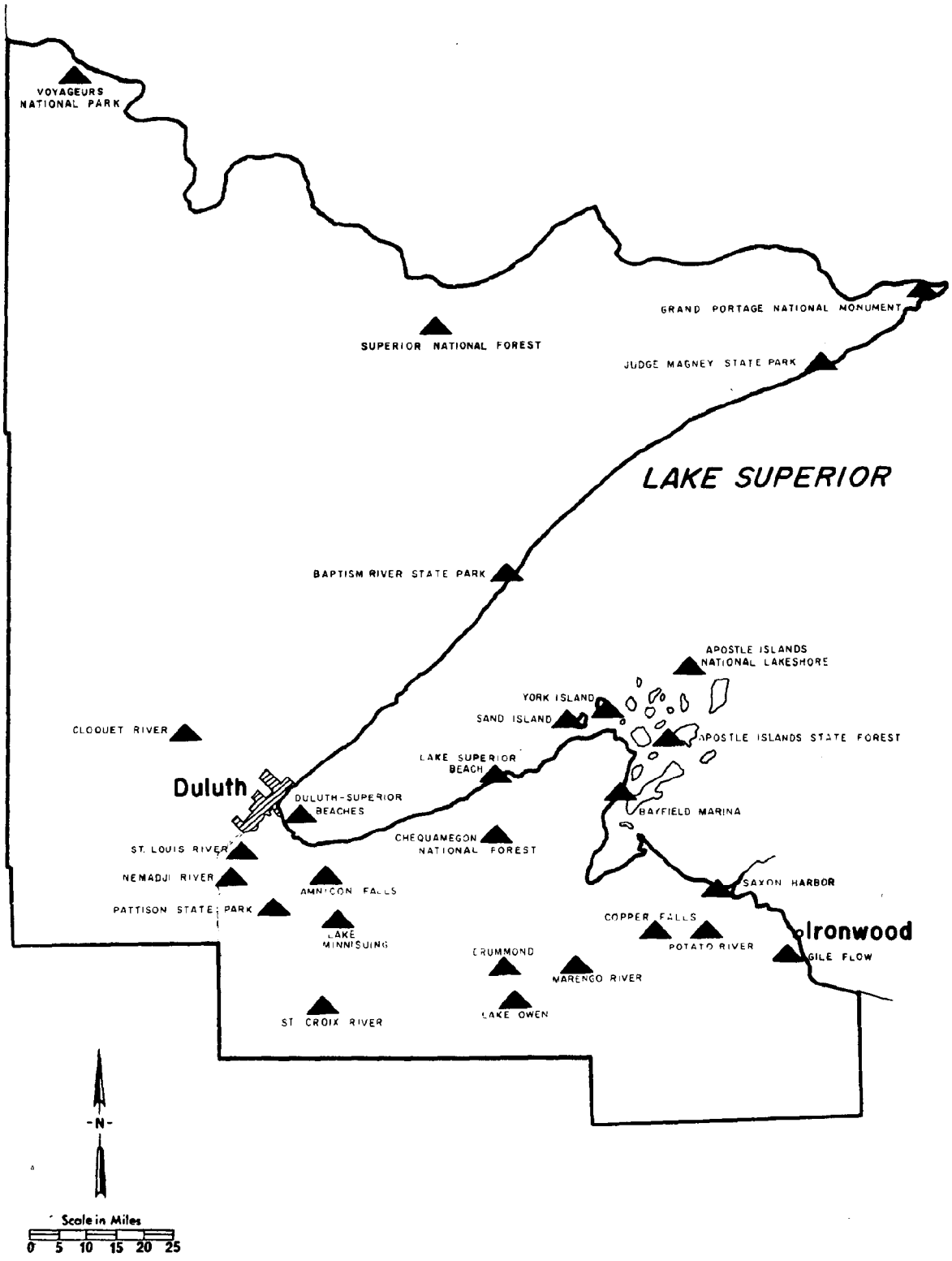
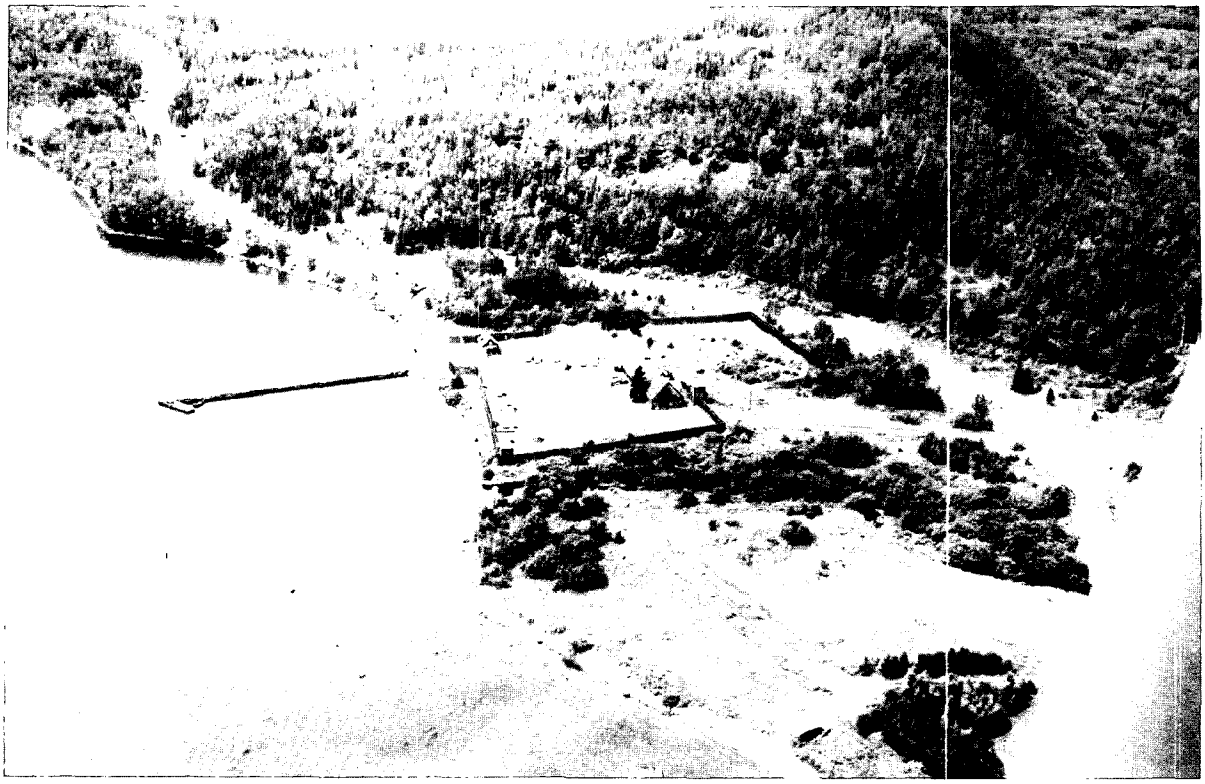


FIGURE 21–57 Reference Map for Planning Subarea 1.1. Inadequate information prohibited the location of all areas identified in text of report.



Courtesy of Minnesota Department of Natural Resources

FIGURE 21–58 Historic Site. The Grand Portage area should be preserved as a scenic and historic place.

(1) acquisition and moderate development of the authorized Voyageurs National Park
(2) acquisition and development of the Apostle Islands National Lakeshore area
(3) continued development of recreational facilities on the Superior and Chequamegon National Forests and other public forest lands
(4) acquisition and development of the upper reaches of the St. Croix River located within Planning Subarea 1.1
(5) acquisition and development of additional lands for two State parks in Minnesota—Baptism River and Judge C. R. Magney State Parks
(6) acquisition and development of the proposed Lake Minnesuing Recreation Area in Wisconsin

In the 1980–2000 time frame, these elements should be given priority:

(1) acquisition and development of the Iron Range area in Iron County, Wisconsin
(2) acquisition and development of the Copper Falls area in Ashland County, Wisconsin
(3) acquisition and development of the Nemadji River area in Douglas County, Wisconsin
(4) acquisition and development of the Drummond area in Bayfield County, Wisconsin

The following elements should be given priority during the 2000–2020 time frame:

(1) continued development of the Apostle Islands National Lakeshore
(2) continued development of the Voyageurs National Park

The following miscellaneous items also should be given attention:

(1) the provision of additional access sites on Lake Superior and its tributary streams
(2) the reclamation of polluted beaches along the Lake Superior shore in the Duluth-Superior area
(3) the acquisition of shoreline lands in the Superior and Chequamegon National Forests

4.6.2 Planning Subarea 1.2

This planning subarea is located along southern Lake Superior and is entirely within the State of Michigan (Figure 21–59). The nine

counties which make up this planning subarea contain some of the highest-quality recreational resources in the Great Lakes Region. Examples of such features and resources include Tahquamenon Falls, Pictured Rocks, Huron and Porcupine Mountains, Black River, Wolf Mountain, Silver Mountain, Sturgeon Valley, the Big-Sea-Water Recreation Area, Sylvania Recreation Area, as well as parts of the Ottawa and Hiawatha National Forests, Isle Royale National Park, and a number of State forests.

Much of the land in this area consists of forests interspersed with numerous lakes and streams. Principal streams include the Tahquamenon, Sturgeon, Ontonagon, and Presque Isle Rivers.

Urban development is minimal and heavily oriented to recreation and tourism. Principal cities include Marquette, Sault Ste. Marie, Ironwood, and Houghton-Hancock. Marquette and Sault Ste. Marie have populations of nearly 20,000 each. Duluth and Green Bay, the nearest SMSAs, lie more than 75 miles to the west and south.

The gross land area available for recreation is 2.1 million acres. Of this total, more than 1.8 million are in State and national forests. Isle Royale National Park contains 134,000 acres of wilderness. State and local parks and water-access areas contain another 128,000 acres of land. Of this amount, 122,000 acres in three parks can be considered as wilderness. Water areas encompass 481,000 acres of the Great Lakes and 116,000 acres for inland lakes.

The total annual requirement for all recreational activities in 1970 was approximately 4.6 million recreation days. This figure is projected to increase to 10.1 million recreation days by 2020. The total annual requirement for water-oriented activities was approximately 1.2 million recreation days in 1970, projected to increase to 2.8 million recreation days by 2020.

4.6.2.1 Estimate of Needs

(1) Urban Land Needs

This area has the lowest percentage of effective population from SMSAs of any planning subarea in the Region, approximately four percent. The largest cities in this area include Sault Ste. Marie and Marquette. Although the character of the area is definitely nonurban, it has a need for 1,390 acres for development of urban-type recreational facilities.

(2) Nonurban Needs

Based on the demand methodology used in this study, estimates of requirements for developed land indicate a sufficient supply of swimming beaches and picnicking facilities through 1980, and sufficient camping facilities through 2020. However, the Michigan Outdoor Recreation Plan showed a prorated need for the development of nearly 1,900 more camp sites and nearly 2,100 parking spaces between 1965 and 1975. It also proposed the acquisition of approximately 2,200 additional acres of land. One of the constraints in the Framework Study is that the methodology used does not adequately reflect the directional patterns of travel emanating from major population centers such as Detroit. Furthermore, a significant number of people traveling to this area for recreational purposes are willing to travel more than 150 miles from southern urban areas for normal summer weekends.

Total developed land needs for nonurban recreational areas amounted to 410 acres in 1970, 640 in 1980, 870 in 2000, and 1,290 acres in 2020. It is estimated that 50 percent of those needs can be satisfied on existing publicly owned lands. Total needs for new lands amounted to 1,400 acres in 1970, 2,100 in 1980, 2,900 in 2000, and 4,300 acres in 2020.

(3) Total Land Needed for Recreation

It is estimated that the total amount of land that should be acquired and developed as Class I and Class II recreational areas will grow from 2,800 acres in 1970 to nearly 8,600 acres in 2020. This estimate is based on the assumption that 50 percent of needs for Class II recreational development can be accommodated on State and Federal forest lands. Table 21–21 portrays the recreational requirements, supply, and needs by activity for Planning Subarea 1.2 for each of the target years.

(4) Water Needs

The water supply base in this planning subarea appears to be adequate to meet present and future demands for boating and related activities.

4.6.2.2 Additional Objectives

In addition to the general objectives listed in Subsection 4.1, specific objectives should include development of recreational oppor-

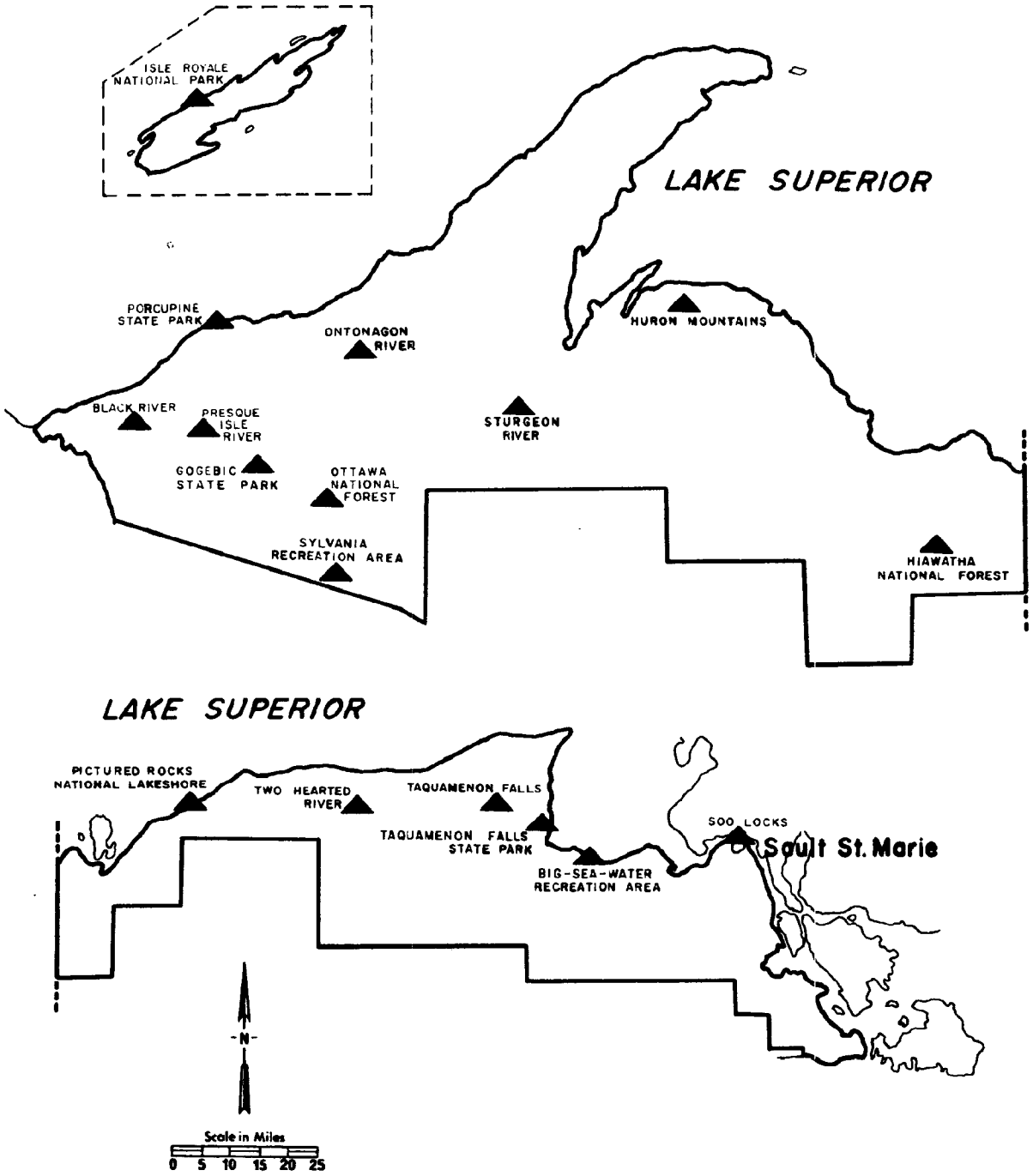


FIGURE 21–59 Reference Map for Planning Subarea 1.2. Inadequate information prohibited the location of all areas identified in text of report.

TABLE 21-21 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 1.2

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	20	60	0	30	60	0	40	60	0	60	60	0
Picnicking	350	580	0	400	580	0	490	580	0	610	580	30
Camping	140	790	0	210	980	0	300	980	0	430	980	0
Parking (General)	50	70	0	60	70	0	80	70	10	110	70	40
Parking (Boats & Water-Skiing)	40	140	0	60	140	0	120	140	0	170	140	30
Subtotal	600	1,640	0	760	1,830	0	1,030	1,830	10	1,380	1,830	100
Acres of Developed Land for Other Summer Activities												
Playfields	870	50	820	1,320	50	1,270	1,760	50	1,710	2,420	50	2,370
Golf	720	150	570	1,100	150	950	1,480	150	1,330	2,020	150	1,870
Subtotal	1,590	200	1,390	2,420	200	2,220	3,240	200	3,040	4,440	200	4,240
Acres of Developed Land for Winter Activities												
Snow Skiing	70	70	0	60	70	0	70	70	0	80	70	10
Sledding	80	0	80	90	0	90	130	0	130	180	0	180
Ice Skating	10	0	10	10	0	10	10	0	10	20	0	20
Subtotal	160	70	90	160	70	100	210	70	140	280	70	210
Total Acres of Developed Land	2,350	1,910	1,480	3,340	2,100	2,320	4,480	2,100	3,190	6,100	2,100	4,550
Acres of Water Surface												
Boating (Including Canoeing, Sailing & Water-Skiing)	21,000	597,000	0	28,000	597,000	0	40,000	597,000	0	56,000	597,000	0
Miles of Trails												
Hiking & Nature Walks	80	250	0	110	250	0	140	250	0	190	250	0
Bicycling	70	20	50	80	20	60	90	20	70	110	20	90
Horseback Riding	20	0	20	20	0	20	30	0	30	40	0	40
Total Miles of Trail	170	270	70	210	270	80	260	270	100	340	270	130
Total Needs for New Lands for Recreation (Acres)												
Class I			1,390			2,210			3,030			4,230
Class II			1,400			2,130			2,930			4,330
Total Land Needs			2,790			4,340			5,960			8,560
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			0			0			0			150
Annual Requirements in Recreation Days												
For All Recreation Activities (1000s)	4,595			5,862			7,604			10,069		
For Water-Oriented Recreation Activities (1000s)	1,199			1,531			2,046			2,751		

tunities by both the public and private sectors to augment the economy of this region.

4.6.2.3 Problems

In addition to the problems listed in Subsection 4.5, there are several others peculiar to this area. First, this area lies within the economically depressed upper Great Lakes. Many operators of private recreational enterprises have limited financial resources to develop facilities competitive with those in other major recreational areas. The prime recreational season in this area is rather short although the introduction of coho and chinook salmon should help to extend the prime season by one or two months.

This planning subarea is rather remote from the largest urban centers, Detroit and Chicago. Both of these cities are nearly 300 miles from the nearest boundaries. Thus, many people who seek weekend recreational opportunities in the north country often stop short of this area. On the other hand, it is well located for those who seek opportunities for extended vacations.

The weather is somewhat changeable during the prime recreational season. On a day-to-day basis, it ranges from quite warm to cool. The cooler weather discourages those people who desire to swim and water-ski.

Establishment of the Pictured Rocks and Apostle Islands Lakeshore Areas will undoubtedly stimulate more use of the area. This will necessitate the construction of better highways and the establishment of sound resource management policies to meet the increased recreational demand on these areas without deterioration of the resource base.

4.6.2.4 Suggestions for Future Action

Of the 2.1 million acres of publicly owned land in the planning subarea, approximately 860,000 acres are in national forests, 134,000 in national parks, and 961,000 acres in State forests. Much of this land is undeveloped or underdeveloped, and could be improved to provide increased recreational facilities.

Within the Ottawa National Forest is the Sylvania Recreation Area, administered by the U.S. Forest Service. Based on data from the U.S. Forest Service[46] an additional 3,400 acres could be developed here in Ottawa National Forest. Opportunities for canoeing, camping, hiking, picnicking, swimming, hunting, fishing, and sightseeing can be expanded.

Hiawatha National Forest is also administered by the Forest Service. The Big-Sea-Water Recreation Area is located within the Hiawatha National Forest and includes 64,000 acres. Its proposed development, planned by the U.S. Forest Service, is to be accomplished over a 20-year period. The program calls for campgrounds, swimming developments, picnic grounds, boat launching facilities, hiking, riding and snowmobile trails, visitor information services, and access and scenic loop roads and trails. Camping facilities should be made available to accommodate 640 families in 5 years and 2,500 families within 20 years.

If State forest lands could be developed to a level of one-fifth of one percent they could support additional development on 1,900 acres. It may be necessary for Michigan to acquire additional lake frontage within State forest areas to fulfill the maximum potential of these lands.

More than 126,000 acres are included in State parks. Approximately 122,000 acres are in three State parks—Tahquamenon Falls, Gogebic, and Porcupine Mountains, which are very lightly developed. Improvement of one-half of one percent of these lands would result in an additional 600 acres of developed recreational land.

Based on these data, and on an assumed level of development for the large State parks, a total of 5,900 acres of land could be developed intensively for recreational use. It was assumed that 50 percent of all Class II needs could be met on these publicly owned lands.

In addition to an intensification of development on existing recreation lands, many other resources with recreational potential are present in this planning subarea:

(1) Of the 160 acres of beaches on Lake Superior classified in the IJC Study,[16] almost 128 acres are in public ownership. Most of these beaches could support more intensive uses.

(2) The estuarine areas along Lake Superior should be preserved and managed for fish and wildlife, and recreational potential should be developed to the extent that it is compatible with this management.

(3) Michigan's 1965 State Park Ten-Year Program[22] showed a proposed expansion of 11 parks in Planning Subarea 1.2. This will involve the acquisition of more than 2,800 acres and the development of 1,749 campsites and 2,088 parking spaces.

(4) Development of public access sites on those lakes and streams which presently do

not have suitable access would be especially beneficial for boating and fishing.

(5) A number of rivers may have potential as wild or scenic rivers. They include the Tahquamenon (Figure 21–60), Presque Isle, Two Hearted, and Ontonagon Rivers.

(6) The proposed North Country Trail will cross a portion of this area. There is ample opportunity to develop additional trails for hiking, horseback riding, and snowmobiling on publicly owned land as the need arises.

(7) The rivers and streams can provide a limited amount of canoeing.

(8) Lakes should be examined for their potential as scenic lakes, and those that qualify should be managed to preserve their natural states.

(9) The private sector has provided substantial quantities of recreational opportunities in certain activities, especially camping and snow skiing.

4.6.2.5 Plan Design

For most Class I type recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea. Existing underdeveloped public lands should be more intensively improved while maintaining a setting as natural as possible.

For Class II type recreational areas, two alternatives should be considered. First, all existing publicly owned lands, consisting largely of State parks and State and national forests, should be developed to optimal capacity. It is estimated that these lands can accommodate 50 percent of needed recreational facilities, Also, new lands should be acquired and developed in strategic areas to satisfy large amounts of needs in a high-quality setting.

In addition to the above, priority should be given to the acquisition, development, preservation, and restoration of the following elements during the entire 1970–2020 time period:

(1) segments of Lake Superior shore that have significant recreational potential, together with adequate backup lands

(2) segments of shorelines on inland lakes that have significant potential for recreational development, together with adequate backup lands

(3) segments of rivers that possess the necessary qualities for inclusion in a State or national rivers system

(4) extension of the trail system to provide additional opportunities for hikers, horseback riders, snowmobilers, and bicyclers

(5) lakes that possess the pristine qualities necessary for inclusion in the wild and scenic lakes system

(6) additional access sites on inland lakes and streams

(7) additional harbors of refuge along the Lake Superior shore

4.6.3 Planning Subarea 2.1

Planning Subarea 2.1 (Figure 21–61) encompasses a 3-county area of Michigan and a 20-county area of Wisconsin. Located along the northwestern shores of Lake Michigan, it contains many inland lakes and large tracts of public forest lands, mainly the Nicolet National Forest. Lake Winnebago, Wisconsin's largest inland lake, lies in the southern portion of the area. Some of the recreational resources are of national significance. A portion of the Wolf River, designated as a component of the national Wild and Scenic Rivers System, includes a 51-mile segment from the Langlade–Menominee County line downstream to Keshena Falls.

The area is predominantly nonurban in character, with a 1970 population of approximately 992,600 persons. Only 15.8 percent of the population resides in the single SMSA of Green Bay. Other large cities (1970 populations in parentheses) include Sheboygan (47,000), Appleton (54,000), Manitowoc (33,215), Oshkosh (47,000), and Fond du Lac (34,180).

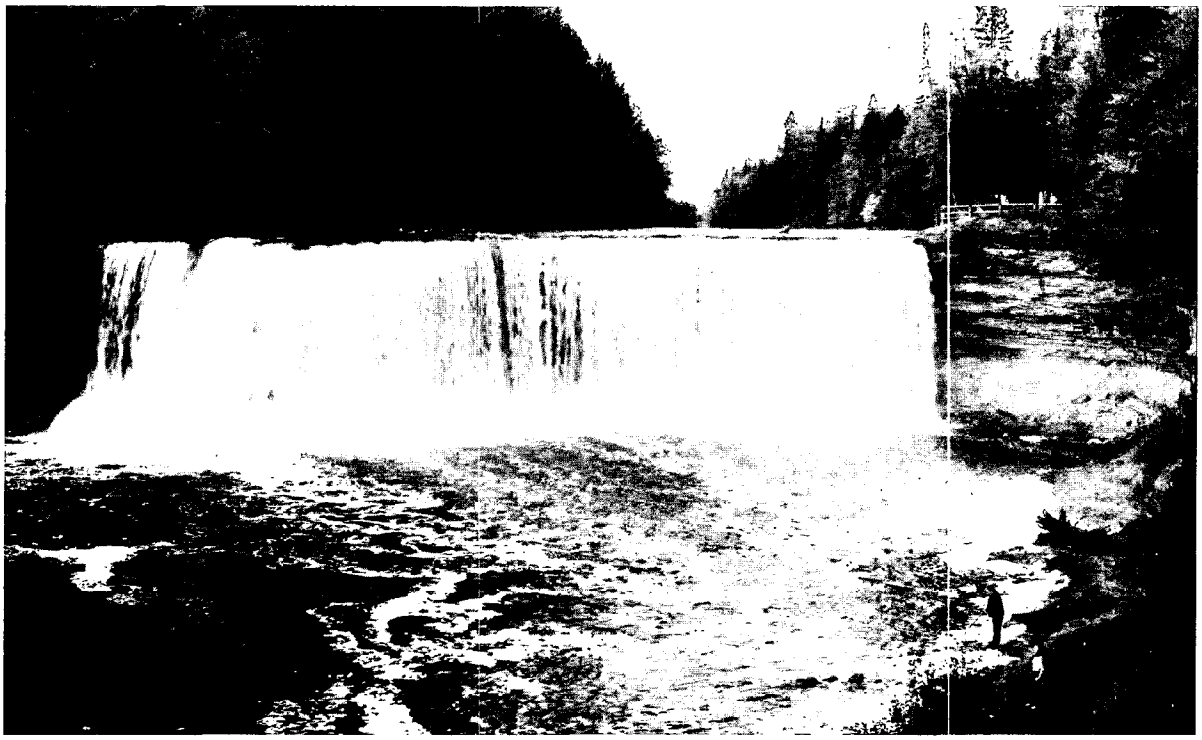
The gross land acreage available for recreation is approximately 1,300,000 acres. Most of this is Federal, State, and county forests. Water surface available for recreation totals 245,000 acres on the Great Lakes and 251,000 acres on the inland lakes.

Total recreational requirement for 1970 was 38,000,000 recreation days. This is estimated to increase to 114,000,000 recreation days by 2020. Requirements for water-oriented activities, estimated to be nearly 10,000,000 recreation days in 1970, are expected to increase to nearly 31,000,000 recreation days by 2020.

4.6.3.1 Estimate of Needs

Most of the population is located in the southern portion, in the Cities of Sheboygan, Manitowoc, Green Bay, and Fond du Lac. Many users of the area's recreational facilities

Courtesy of Michigan Tourist Council



Courtesy of Michigan Department of Natural Resources

FIGURE 21–60 Scenic Attractions. Lake Superior region includes the Pictured Rocks and Tahquamenon Falls.

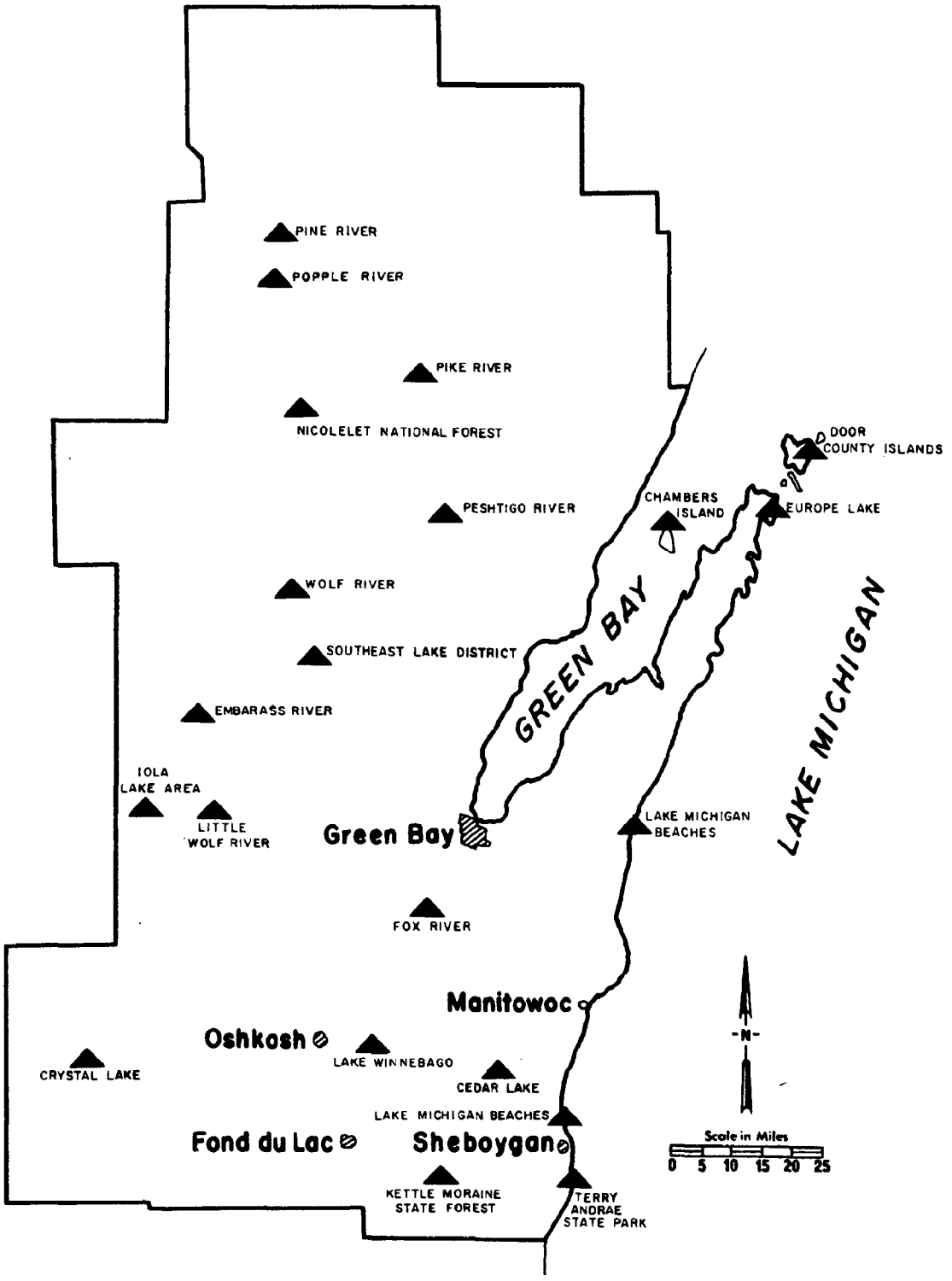


FIGURE 21–61 Reference Map for Planning Subarea 2.1. Inadequate information prohibited the location of all areas identified in text of report.

come from Milwaukee, which lies just south of the planning subarea.

In view of the amount of unused land in public forests and parks within the area, it could be assumed that no additional land would need to be acquired to meet nonurban needs until the year 2000. However, this land is generally remote from the users and therefore does not allow for sufficient weekend and vacation use. For the Wisconsin portion of the planning subarea, it is estimated that 50 percent of the needs for Class II lands can be met on existing public lands. This estimate does not hold for the Michigan portion because it does not have the same type of population distribution.

(1) Urban Land Needs

The total need to meet urban demands for recreational land was 8,200 acres in 1970. This will grow to more than 47,000 acres by 2020. Greatest developed-facility need is for playfields. In 1970, 500 miles of bicycle trails were needed. Acreage requirements for sledding are large and will probably continue to grow through the coming decades.

(2) Nonurban Land Needs

Total developed land needs for nonurban recreational areas amount to 3,950 acres in 1970, 5,840 in 1980, 12,640 in 2000, and 22,140 acres in 2020. It is estimated that 50 percent of these needs can be satisfied on existing publicly owned lands. Therefore, total need for new lands for nonurban recreation amounted to 13,100 acres in 1970 and will increase to 73,800 acres in 2020. The greatest acreage need is for picnicking, followed closely by camping.

(3) Total Land Needed for Recreation

Land which must be acquired to meet the recreational needs will increase from 21,000 acres in 1970 to 120,000 acres in 2020. Table 21–23 portrays recreational requirements, supply, and needs by activity for Planning Subarea 2.1 for each of the target years.

(4) Water Needs

No surface water needs are shown until the year 2020, when 129,000 acres will be needed in the area. A strictly quantitative view of this resource can be misleading, however, because much of the water in the existing supply cannot be safely used for swimming and waterskiing. The water quality of lower Green Bay, in particular, is so poor that it severely restricts water sports.

4.6.3.2 Additional Objectives

This area should receive increased attention from the private sector for vacation-use recreational developments. These will not be easily achieved because of the many problems previously noted.

4.6.3.3 Suggestions for Future Action

Many areas with recreational potential of various types exist in this planning subarea; one nationally significant area is the Ice Age National Scientific Reserve. When completed, this 325,000-acre park will preserve significant features of Wisconsin's continental glaciation, including moraines, eskers, kames, kettleholes, and drumlins. A portion of the Wolf River (Figure 21–62) has been designated as a wild and scenic river by the National Wild and Scenic Rivers Act of 1968. The Pike, Pine, and Popple Rivers have also been designated as scenic rivers at the State level. These are to receive special management to assure the preservation and enhancement of their aesthetic, scenic, and recreational values.

The national, State, and county forests have high potential for recreational use and development. The Nicolet National Forest contains more than 592,000 acres, of which an estimated 5,300 could be developed for intensive recreational use. Of the more than 437,000 acres of State forest in the Michigan portion of the planning subarea, approximately 900 acres could be developed for intensive recreational use. An additional 150 acres of recreational development could be accommodated on the 26,000 acres of State forest lands within the planning subarea in Wisconsin. There are also 433,000 acres of county forest in Wisconsin in Planning Subarea 2.1. It is estimated that these lands could accommodate nearly 900 acres of intensive recreational development. This means a potential for public forest lands of approximately 7,250 acres of intensive recreational development.

The Wisconsin Outdoor Recreation Plan of 1966[70] provides information on areas with recreational development potential. Only the more prominent areas are listed in Table 21–22.

The proposed North Country Trail is to cross to the north of this planning subarea and Wisconsin has proposed a number of State trails, several of which would traverse parts of this planning subarea.

In its 1972 Outdoor Recreation Plan, Wisconsin identified a number of highways with scenic qualities for inclusion into a scenic highway system.

One commercial harbor has been authorized

Courtesy of Wisconsin Department of Natural Resources

FIGURE 21-62 Canoeing on the Wolf River

TABLE 21-22 Potential Recreational Development Areas in Wisconsin, Planning Subarea 2.1

Site	County	Acres
Wolf River	Menominee	17,000
Southeast Lake District	Menominee	8,500
Embarrass River	Shawano	5,000
Skunk Lake Area	Waupaca	4,000
Peshtigo River	Marinette	5,000
Long Tail Point	Brown	160
Fox River	Outagamie, Brown	800
Door County Islands	Door	5,000
Chambers Islands	Door	3,000
Lake Winnebago	Winnebago, Calumet, Fond du Lac	2,500
Neshota River	Manitowoc	1,280
Harpt Lake	Manitowoc	2,200
Cedar Lake	Manitowoc	2,100
Crystal Lake	Marquette	600
Observatory Hill	Marquette	350
Terry Andrae, Lake Michigan	Sheboygan	860
Kettle Moraine	Sheboygan, Fond du Lac	18,700
Little Wolf River	Waupaca	1,800
Lake area over Iola	Waupaca	1,000
Europe Lake	Door	5,600

in this area at Cedar River, Michigan. Additional recreational boat harbors should be constructed as the need arises to permit fuller utilization of the Lake Michigan waters.

A disproportionate number of users of this area's facilities come from the Chicago and Milwaukee metropolitan areas, where local recreational resources are limited. It is anticipated that this northerly traffic flow, stimulated by the interstate highway system, will result in increasing pressure on the resources of this area.

4.6.3.4 Plan Design

New land will have to be acquired in and near urban areas throughout the planning subarea for all Class I type recreational developments.

In the northern one-third of the planning subarea, additional development on existing national, State, and county forest lands can satisfy much of the recreational need for Class II type recreational development. Some additional land should be acquired to preserve areas with outstanding recreational potential.

In the southern two-thirds of the planning subarea, all existing publicly owned lands, consisting chiefly of parks and county forest lands, should be developed to provide additional recreational opportunities. Such developments should be compatible with other uses. New lands should be acquired to satisfy much of the recreational need. Priorities for certain elements are rather critical, because if they are not acquired in the near future, they may not be available at a later time. The following should be given priority during 1970–1980:

(1) acquisition and development of several areas on Lake Winnebago in Winnebago, Calumet, and Fond du Lac Counties
(2) acquisition and development of four areas on Lake Michigan in Kewaunee and Sheboygan Counties
(3) acquisition and development of the Fox River flood plain in Brown and Outagamie Counties
(4) accelerated development of facilities on public forest lands such as the Nicolet Forest and State and county lands

The following elements should be given priority during 1980–2000:

(1) acquisition and development of Chambers Island in Door County
(2) development of recreation facilities in the Kettle Moraine State Forest
(3) acquisition and development of the Skunk Lake area in Waupaca County
(4) acquisition and development of the Nashota River Valley in Manitowoc County
(5) acquisition and development of Crystal Lake in Marquette County
(6) acquisition and initial development of the Southeast Lake District in Menominee County
(7) continued development of recreation facilities on public forest lands

The following elements should be given priority during 2000–2020:

(1) continued development of the Southeast Lake District in Menominee County
(2) acquisition and development of the Door Islands in Door County
(3) acquisition and development of the Little Wolf River Valley in Waupaca County
(4) acquisition and development of Harpt Lake in Manitowoc County
(5) acquisition and development of the Peshtigo River Valley in Marinette County
(6) acquisition and development of the Embarrass River Valley in Shawano County
(7) acquisition and development of the Cedar Lake area in Manitowoc County
(8) acquisition and development of Europe Lake in Door County

The following miscellaneous elements should be considered during the entire projection period:

(1) continued development of public forest lands
(2) the provision of additional access sites in suitable places on Lake Michigan and its tributary streams
(3) the acquisition and development of recreational facilities on small impoundments
(4) the development or nondevelopment of the Wolf, Pike, Pine, and Popple Rivers within the wild and scenic rivers concept
(5) the development of the proposed State of Wisconsin trails system

4.6.4 Planning Subarea 2.2

Portions of three States (seven counties in southeastern Wisconsin, six counties in northeastern Illinois, and four counties in northwestern Indiana) comprise this planning subarea. Nearly 90 percent of the effective population allocated to this area is derived from SMSAs. The five SMSAs within the area include Chicago, the largest city in the Great Lakes Region; Gary-Hammond-East Chicago; Kenosha; Milwaukee; and Racine. Significant recreational resources are found

TABLE 21-23 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 2.1

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	200	170	30	280	370	0	450	370	80	650	370	280
Picnicking	2,890	2,370	520	3,570	2,950	620	4,920	2,950	1,970	6,790	2,950	3,840
Camping	1,180	1,150	30	1,850	1,620	230	3,040	1,620	1,420	4,800	1,620	3,180
Parking (General)	390	120	270	570	130	440	850	130	720	1,220	130	1,090
Parking (Boats & Water-Skiing)	530	200	330	760	390	370	1,220	390	830	1,870	390	1,480
Subtotal	5,190	4,010	1,180	7,030	5,460	1,660	10,480	5,460	5,020	15,330	5,460	9,870
Acres of Developed Land for Other Summer Activities												
Playfields	7,280	1,110	6,170	10,600	1,200	9,400	18,180	1,200	16,980	28,460	1,200	27,260
Golf	6,000	4,700	1,300	8,700	6,200	2,500	15,000	6,200	8,800	23,160	6,200	16,960
Subtotal	13,280	5,810	7,470	19,300	7,400	11,900	33,180	7,400	25,780	51,620	7,400	44,220
Acres of Developed Land for Winter Activities												
Snow Skiing	520	470	50	550	560	0	700	560	140	900	560	340
Sledding	640	0	640	810	0	810	1,300	0	1,300	2,050	0	2,050
Ice Skating	50	10	40	80	10	70	130	10	120	200	10	190
Subtotal	1,210	480	730	1,440	570	880	2,130	570	1,560	3,150	570	2,580
Total Acres of Developed Land	19,680	10,300	9,380	27,770	13,430	14,440	45,790	13,430	32,360	70,100	13,430	56,670
Acres of Water Surface												
Boating (including Canoeing, Sailing & Water-Skiing)	167,000	496,000	0	249,000	496,000	0	403,000	496,000	0	625,000	496,000	129,000
Miles of Trails												
Hiking & Nature Walks	590	140	450	930	450	480	1,480	450	1,030	2,200	450	1,750
Bicycling	580	100	480	700	120	580	950	120	830	1,300	120	1,180
Horseback Riding	140	30	110	180	80	100	260	80	180	380	80	300
Total Miles of Trail	1,310	270	1,040	1,810	650	1,160	2,690	650	2,040	3,880	650	3,230
Total Needs for New Lands for Recreation (Acres)												
Class I			8,200			12,940			27,800			47,620
Class II			13,100			19,460			42,100			73,800
Total Land Needs			21,300			32,400			69,900			121,420
Total Needs for New Water-Oriented Recreation Lands (Acres)												
Total Water-Oriented Land Needs			3,930			5,600			16,700			32,900
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	38,270			51,091			77,884			114,037		
For all water-oriented recreation activities (1000s)	9,984			13,775			20,865			30,679		

Courtesy of Illinois Department of Conservation

FIGURE 21–63 Swimming in Lake Michigan. Illinois Center Beach State Park provides day-use opportunities for many Chicago residents.

in this highly urbanized area. The many inland lakes in Wisconsin, the dunes along southeastern Lake Michigan, and the Lake Michigan shoreline form the foundation of the area's recreational resource base.

The gross land available for recreation in this planning subarea is 122,400 acres. Over 50,000 acres are in State, county, and local parks, and almost 47,000 acres are in State forests. Most of the remaining lands are Federally owned. More than 69,000 acres of inland water surface and 124,000 acres of Lake Michigan water surface are available for recreation.

The total recreational requirement for 1970 was estimated to be 170 million recreation days. This is estimated to expand to nearly 500 million by 2020. The water-oriented requirement, estimated to be 44 million recreation days in 1970, is expected to increase to 80 million recreation days by 2020.

4.6.4.1 Estimate of Needs

(1) Urban Land Needs

The presence of a large population in and around this planning subarea—together with increasing income, mobility, and leisure time—points to an ever increasing pressure on recreational facilities, particularly for day-use activities (Figure 21–63). In 1970 the needs for land for urban recreation amounted to 17,300 acres. This need is expected to increase to 149,000 acres by 2020. By 2020 the acreage needs for playfields and golf courses will far surpass the acreage needs for other activities. Table 21–26, which portrays requirements, supply, and needs by activity for each of the target years, shows a need of more than 44,000 acres for playfields and 72,000 acres for golf courses by the year 2020. The need for swimming beach acreage is expected to grow from more than 300 acres in 1970 to 2,000 acres by the year 2020. There is a definite need for bicycling, horseback, and foot trails in this planning subarea as well.

(2) Nonurban Land Needs

Total acreage allocated to meet nonurban needs was 42,000 in 1970, projected to increase to 238,000 acres by 2020. Camping had the largest developed acreage need in 1970 and this is not expected to change by 2020. Picnicking also shows substantial acreage needs for all time periods.

(3) Total Land Needed for Recreation

Necessary land to meet recreational needs will increase from 59,000 acres in 1970 to nearly 400,000 acres by 2020. Table 21–26 portrays recreational requirements, supply, and needs by activity for Planning Subarea 2.2 for each of the target years.

(4) Water Needs

Current surface-water needs are 119,000

acres. By 2020 this will grow to more than 1,000,000 acres.

4.6.4.2 Problems

Many problems have previously been identified. Additional obstacles in meeting the general objectives include, for example, instability in the business of recreation. This is affected by variation in the nation's and States' economy to a greater extent than most other businesses. The high risk factor is reflected in the amount of new enterprise investments and continuance of existing enterprises. The problem is Basinwide, but most noticeable in Planning Subarea 2.2 where recreational lands are frequently converted to other, high-profit uses which makes them too expensive to purchase for recreational purposes.

Secondly, the distribution of natural resources upon which outdoor recreation depends is not aligned with the distribution of requirements. Distances from the metropolitan areas to recreation resources are great. The lack of abundant and suitable land and water resources in Planning Subarea 2.2, where requirements are greatest, best illustrates this problem.

Thirdly, out-of-State demands on limited supplies of recreational resources and facilities within Planning Subarea 2.2 have become a problem. In nearly all cases, the objective of counties and smaller governmental units is to first provide recreational opportunities for their resident populations.

4.6.4.3 Suggestions for Future Action

Potential recreational resources are limited within this area and consist chiefly of Lake Michigan shoreline, lakes in the southeastern Wisconsin and northeastern Illinois areas, a number of small reservoir sites, mined areas southwest of Chicago and the flood plains within the planning subarea.

The Wisconsin Outdoor Recreation Plan of 1966[70] provides information about areas with potential for recreational development. The more prominent of these within Wisconsin's portion of Planning Subarea 2.2 (Figure 21–64) are set forth in Table 21–24.

Information obtained from the State of Wisconsin specifically for this study indicates the following as proposed recreation areas in Planning Subarea 2.2 (Wisconsin portion):

(1) Harrington Beach State Park. Land acquisition for this park has already begun. The ownership goal is 644 acres along Lake Michigan. One mile of sandy shore along the Lake and an abandoned 23-acre quarry will be developed into a day-use facility.

(2) Oak Creek Lakefront Park, located in the City of Oak Creek, Milwaukee County. This 223-acre park, including 6,000 feet of Lake Michigan shoreline, will provide a variety of multi-seasonal recreation activities (picnicking, hiking, golfing, and swimming) all within a one-hour drive of more than one million people.

(3) Ela-Fox River Park, located in Racine County. This 250-acre park with 5,100 feet of frontage along the Fox River will be developed for multi-use activities including camping, picnicking, fishing, hiking, and nature study.

(4) Quarry Lake Park. This is a 40-acre park in Racine County with 3,500 feet of Quarry Lake frontage and 2,500 feet of frontage along the Root River. Facilities for swimming, fishing, and other day-use activities will be provided.

(5) Cliffside Park. This 222-acre park with 3,580 feet of Lake Michigan frontage contains high bluffs and a sand beach. It will be developed for day-use activities.

(6) Fisher Park Extension (Browns Lake). A 48-acre addition to the present 5-acre site would be developed for swimming and day-use activities.

(7) Joyce Park. This 244-acre area would join an existing 16-acre county park site and State land. This area is the only available tract in Kenosha County where top-quality family camping could be developed.

(8) Bong County Park. Three hundred and sixty acres of the former Bong Air Base would make up this park. Of this total, 120 acres are to be developed for day-use facilities. This area includes ponds, large areas of natural hardwoods, open fields, and rolling topography.

(9) Bong Wildlife Area. This area, which will be acquired for open space and recreational land, will provide facilities for 1.9 million people in the southeastern Wisconsin area. Hunting, hiking, nature study, swimming, riding, picnicking, camping, and dog training areas will be developed. At present, Wisconsin's Department of Natural Resources owns 1,980 acres, and 1,591 are owned but clouded by option. The Department of Natural Resources' goal for the project is 4,548 acres.

The areas in Table 21–25 were listed by the Northeastern Illinois Metropolitan Area

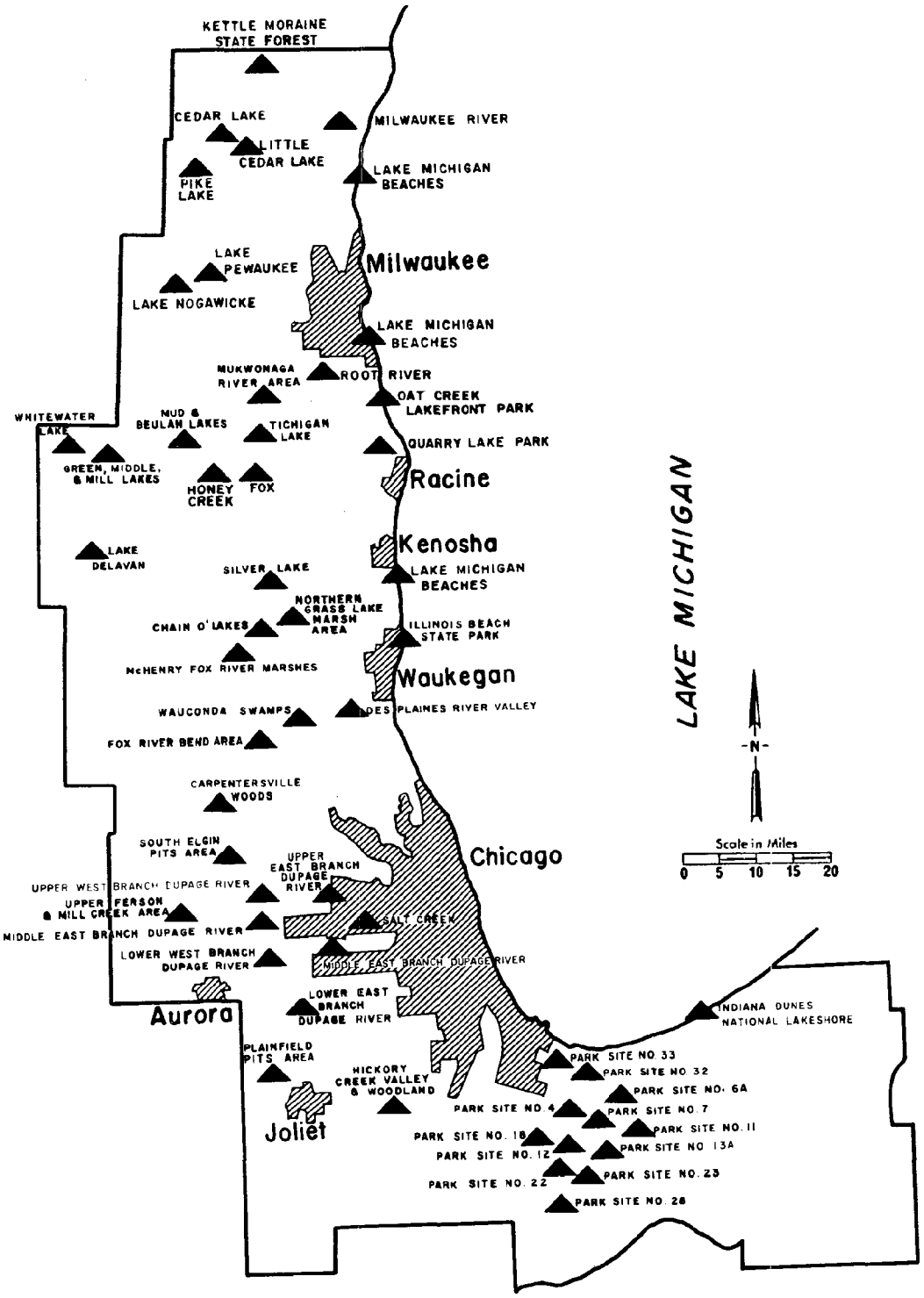


FIGURE 21–64 Reference Map for Planning Subarea 2.2. Inadequate information prohibited the location of all areas identified in text of report.

TABLE 21-24 Potential Recreational Development Areas in Wisconsin, Planning Subarea 2.2

Site	County	Acres
Silver Lake	Kenosha	250
Lake Michigan	Kenosha	200
Hooker Lake	Kenosha	300
Des Plaines River	Kenosha	200
Lake Michigan	Milwaukee	300
Root River	Milwaukee	860
Milwaukee River	Ozaukee	1,500
Lake Michigan	Ozaukee	400
Milwaukee River	Ozaukee	250
Lake Michigan	Ozaukee	250
Lake Michigan	Ozaukee	800
Honey Creek	Racine	280
Lake Michigan	Racine	400
Fox River	Racine	150
Waubeesee Lake	Racine	320
Lake Michigan	Racine	500
Whitewater Lake	Walworth	2,500
Sugar Creek	Walworth	5,000
Lake Delavan	Walworth	200
Green, Middle, and Mille Lakes	Walworth	700
Mud and Beulah Lake	Walworth	300
Lulu Lake	Walworth	250
Pike Lake	Washington	1,600
Cedar Lake	Washington	1,250
Little Cedar Lake	Washington	960
Kettle Moraine State Forest	Washington	1,200
Lake Five	Washington	350
Silver Lake	Washington	800
Oconomowoc River	Waukesha	560
Lake Nagawicka	Waukesha	400
Pewaukee Lake	Waukesha	375
Dutchman Lake	Waukesha	300
Mukwonago River	Waukesha	900

Planning Commission[35] as having significant potential for recreational development.

The Action Plan for Outdoor Recreation in Illinois lists the following plans for potential recreation areas in Planning Subarea 2.2 (Illinois portion):

(1) expand Chain O'Lakes and Illinois Beach State Park through acquisition of adjoining lands

(2) develop Lake Michigan shoreline wherever possible for swimming, fishing, and boat launching

(3) acquire and develop the 31 recreational areas identified in the Northeastern Illinois Planning Commission report, "Open Space in Northeastern Illinois"

(4) utilize various strip mines no longer in production

(5) Little Calumet River Project—beautification, local recreation, and fishing

In addition to the above specific plans, general Statewide plans are applicable. The State could develop recreation areas around all public bodies of water; consider all flood plain areas as potential for recreation; expand educational facilities in conjunction with archaeologic, historic, and ecologic areas; and encourage public use of private and quasi-public utility and corporation areas for recreation.

There are several proposed areas within Indiana's portion of Planning Subarea 2.2.

TABLE 21-25 Potential Recreational Development Areas in Illinois

Site	County	Acres
Northern Grass Lake Marsh Area	Lake	3,850
Sullivan and Fish Lake Area	Lake	4,100
McHenry Fox River Marshes	McHenry	7,000
Wauconda Swamps	Lake	1,600
Fox River Bend Area	Lake, McHenry	6,000
Lake Michigan Beach	Lake	1,900
Des Plaines River Valley	Lake	9,600
Carpentersville Woods	Kane	1,200
South Elgin Pits Area	Kane, Cook	1,400
Upper Fersons and Mill Creek Areas	Kane	7,000
Upper Blackberry Creek Valley	Kane	4,000
Upper West Branch DuPage River Valley	DuPage	1,000
Big Rock Creek Valley	Kane	5,000
Middle West Branch DuPage River Valley	DuPage	800
Lower West Branch DuPage River Valley	DuPage	400
Upper East Branch DuPage River Valley	DuPage	600
Middle East Branch DuPage River Valley	DuPage	500
Lower East Branch DuPage River Valley	DuPage, Will	2,600
Itasca Salt Creek Valley	DuPage	600
North Addison Salt Creek Valley	DuPage	160
South Addison Salt Creek Valley	DuPage	170
Elmhurst Salt Creek Valley	DuPage	150
Plainfield Pits Area	Will	2,000
Fiddyment Creek Valley	Will	750
Spring Creek Valley and Woodland	Will	1,500
Hickory Creek Valley and Woodland	Will	2,250
Des Plaines River Gravel Island	Will	6,000
Des Plaines River Bluffs	Will	1,600
Will County Strip Mines Area	Will	8,000
Plum Creek Valley	Cook	4,500
Lake Michigan Shoreline	Cook	4,000
Total Acres		90,230

Hobart Site No. 2 ultimately is to contain a total of 280 acres. It is heavily wooded with oak trees. The area will be used for fishing, boating, and swimming (a 16-acre lake is proposed). Hiking trails and picnicking facilities are planned. Cedar Lake Site No. 3 covers an area of 160 acres with one-half open space (cultivated fields) and one-half wooded. There is a two acre swamp and, with a dam, a 25- to 30-acre lake is possible. The area would be used for water-related recreational activities (fishing, boating, swimming, etc.), camping, picnicking, biking, trails, and open space. Leroy Site No. 4 is composed of 408 acres which includes a heavily wooded area, hills and prairie land, and 5 acres of existing ponds which indicate that damming will provide a 30- to 40-acre lake. This site will be used for camping, picnicking, horseback riding, swimming, fishing, boating, and winter sports.

Park Site No. 12, 441 acres, is proposed to extend the public open space west of the future county courthouse and office center. Park Site No. 11, a 24.5-acre site, is heavily wooded, lies adjacent to Deep River, and has an old mill as an historical point of interest. In Park Site No. 13A, the Deep River flows through a 556-acre site that provides a suitable area for camping. Park Site No. 7, a 160-acre site, is located on the flood plain of Turkey Creek. It would provide scenic beauty and open space for the surrounding urban population.

Park Site No. 18 is a 158-acre wooded site excellently suited for nature study. Park Site No. 32, a swampy 504 acres, is located along the Little Calumet River in a highly urbanized area. Park Site No. 6A is a heavily wooded and swampy area encompassing 280 acres along Deep River. Park Site No. 4 consists of 344 acres of gently sloping land well suited for an 18-hole golf course.

Park Site No. 28 contains Redwing Lake and encompasses 810 acres. Park Site No. 22, a 340-acre site, would create a large open green space adjacent to Lake County Fair Grounds. Park Site No. 23, a 308-acre park along Deep River, would provide opportunities for camping. Park Site No. 33, a 60-acre area, would be classified as a community park.

Congress has authorized the establishment of the Indiana Dunes National Lakeshore along the southern shore of Lake Michigan between Gary and Michigan City, Indiana. This land, totaling 8,700 acres, will preserve some of the remaining dunes, bogs, and marshes, and provide recreational opportunities along the beaches and dunes. Camping and picnicking sites will be developed in an inland section. The use of the rest of the National Lakeshore will be limited to hiking, bicycling, and horseback riding.

The proposed Green Bay Trail is located on the abandoned Chicago, Aurora, and Elgin Electric Railway right-of-way through Kane, Cook, and DuPage Counties. The towpath of the Illinois-Michigan Canal from Chicago to LaSalle is suitable for hiking and could be improved to include bicycle and horseback trails.

Several small potential reservoir sites are present in Will and Cook Counties. These should be developed for either multiple-purpose use or for single-purpose recreational use.

Redevelopment and rehabilitation of land and facilities will be necessary if inner-city needs are to be satisfied. Some urban needs can be met through improvement or construction of neighborhood multi-purpose community centers, tot lots, parks, and playgrounds. Such facilities, especially community centers, should be operated in conjunction with the public schools. School facilities also should be made available for general recreational and cultural activities to the fullest possible extent.

A substantial potential exists for development of outdoor recreational opportunities by the private sector. This has provided substantial amounts of opportunities in the past in those areas where it can function profitably. The private sector should be encouraged to continue development of recreational facilities where it is feasible to do so.

Such a large volume of needs exists in this planning subarea that a substantial portion of these needs will have to be transferred to other areas. A large part of this shift will go to Planning Subareas 2.1, 1.1, 1.2, 2.3, and 2.4 of the Great Lakes Region. The extent of transfer to each of these areas is unknown.

To bring more recreational opportunities to this planning subarea, a Level B study should be conducted. Such a study would intensively evaluate the recreational problems and solutions within the planning subarea.

4.6.4.4 Plan Design

For most Class I type recreational developments, new land will have to be acquired in and near urban areas throughout the planning subarea. Those existing public lands which are now underdeveloped should be developed more intensively while maintaining a setting as natural as possible.

For Class II type recreational areas, all existing publicly owned lands (consisting largely of county parks and forests) should be developed to their optimal capacity to provide additional recreational opportunities. Such development should be compatible with other uses where they exist. Some of these lands can accommodate additional facilities for recreational activities not now provided.

New lands will have to be acquired in the planning subarea to satisfy much of the recreational need.

In addition to the above items, the following elements should be given priority for acquisition and development during 1970–1980:

(1) Indiana Dunes National Lakeshore Area—8,700 acres

(2) five areas on Lake Michigan shore in Wisconsin—2,200 acres

(3) Sugar Creek Area, Walworth County, Wisconsin—3,000 acres

(4) Kettle Moraine Forest Area, Washington County, Wisconsin—1,200 acres

(5) Lake Michigan Beach Areas, Lake and Cook Counties, Illinois—2,000 acres

(6) expansion of Chain O'Lakes State Park, Illinois—10,000 acres

(7) Upper Des Plaines River Valley Area, Lake County, Illinois—9,600 acres

(8) Plum Creek Valley Area, Will County, Illinois—4,500 acres

(9) DuPage River Valley Area, DuPage County, Illinois—6,000 acres

(10) Fiddyment Creek, Spring Creek, and Hickory Creek Areas, Will County, Illinois—4,500 acres

(11) Pike Lake Area, Washington County, Wisconsin—1,600 acres

(12) Mukwonago River Area, Waukesha County, Wisconsin—900 acres

(13) Bong Wildlife Area, Kenosha County, Wisconsin—4,500 acres

(14) Park Site No. 12, Lake County, Indiana—441 acres

(15) Park Site No. 13A, Lake County, Indiana—556 acres

(16) Park Site No. 7, Lake County, Indiana—160 acres

(17) Park Site No. 18, Lake County, Indiana—158 acres

(18) Park Site No. 32, Lake County, Indiana—504 acres

The following elements should be given priority for acquisition and development during 1980–2000:

(1) Milwaukee River Area, Ozaukee County, Wisconsin—1,750 acres

(2) Root River Area, Milwaukee County, Wisconsin—860 acres

(3) Des Plaines River Area, Kenosha County, Wisconsin—200 acres

(4) Hooker Lake Area, Kenosha County, Wisconsin—300 acres

(5) Silver Lake Area, Kenosha County, Wisconsin—250 acres

(6) Honey Creek Area, Racine County, Wisconsin—300 acres

(7) Waubeesee Lake Area, Racine County, Wisconsin—320 acres

(8) Lake Michigan Area, Racine County, Wisconsin—500 acres

(9) Whitewater Lake Area, Walworth County, Wisconsin—2,500 acres

(10) Sugar Creek Area, Walworth County, Wisconsin—3,000 acres

(11) Oconomowoc River Area, Waukesha County, Wisconsin—560 acres

(12) Lake Nagawicka Area, Waukesha County, Wisconsin—400 acres

(13) Cedar Lake and Little Cedar Lake Areas, Washington County, Wisconsin—2,200 acres

(14) complete Chain O'Lakes Area, Lake and McHenry Counties, Illinois—7,000 acres

(15) Lake Michigan Beach Areas, Lake and Cook Counties, Illinois—4,000 acres

(16) Upper Ferson and Mill Creek Area, Kane County, Illinois—3,000 acres

(17) Des Plaines Gravel and Bluff Areas, Will County, Illinois—3,000 acres

(18) two regional parks in northwest Indiana—4,000 acres

(19) Upper Blackberry Creek Valley Area, Kane County, Illinois—4,000 acres

(20) Park Site No. 11, Lake County, Indiana—24.5 acres

(21) Park Site No. 6A, Lake County, Indiana—280 acres

(22) Park Site No. 4, Lake County, Indiana—344 acres

(23) Park Site No. 28, Lake County, Indiana—810 acres

The following elements should be given priority for acquisition and development during 2000–2020:

(1) Green, Middle, and Mill Lakes Area, Walworth County, Wisconsin—700 acres

(2) Mud and Beulah Lakes Area, Walworth County, Wisconsin—700 acres

(3) Lake Five Area, Washington County, Wisconsin—350 acres

(4) Silver Lake Area, Washington County, Wisconsin—800 acres

TABLE 21-26 Outdoor Recreation Requirements, Supply, and Needs by Activity PSA 2.2

Activity	1970			1980			2000			2020		
	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	780	460	320	1,140	510	630	1,780	510	1,270	2,540	510	2,030
Picnicking	4,570	4,260	310	5,720	4,860	860	7,830	4,860	2,970	10,630	4,860	5,770
Camping	2,910	750	2,160	4,600	940	3,660	7,520	940	6,580	11,720	940	10,780
Parking (General)	1,640	700	940	2,270	720	1,550	3,380	720	2,660	4,750	720	4,030
Parking (Boats & Water-Skiing)	1,310	620	690	1,990	690	1,300	3,170	690	2,480	4,620	690	3,930
Subtotal	11,210	6,790	4,420	15,720	7,720	8,000	23,680	7,720	15,960	34,260	7,720	26,540
Acres of Developed Land for Other Summer Activities												
Playfields	14,500	11,600	2,900	21,400	11,700	9,700	36,300	11,700	24,600	56,100	11,700	44,400
Golf	23,600	12,100	11,500	34,660	13,900	20,760	59,400	13,900	45,500	86,740	13,900	72,840
Subtotal	38,100	23,700	14,400	56,060	25,600	30,460	95,700	25,600	70,100	142,840	25,600	117,240
Acres of Developed Land for Winter Activities												
Snow Skiing	2,080	170	1,910	2,240	200	2,040	2,800	200	2,600	3,500	200	3,300
Sledding	2,520	0	2,520	3,240	0	3,240	5,020	0	5,020	8,000	0	8,000
Ice Skating	190	760	0	310	760	0	500	760	0	770	760	10
Subtotal	4,790	930	4,430	5,790	960	5,280	8,320	960	7,620	12,270	960	11,310
Total Acres of Developed Land	54,100	31,420	23,250	77,570	34,280	43,740	127,700	34,280	93,680	189,370	34,280	155,090
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	312,000	193,000	119,000	482,000	193,000	289,000	792,000	193,000	599,000	1,213,000	193,000	1,020,000
Miles of Trails												
Hiking & Nature Walks	1,150	250	900	1,850	280	1,570	2,870	280	2,590	4,120	280	3,840
Bicycling	2,320	60	2,260	2,770	70	2,700	3,780	70	3,710	5,100	70	5,030
Horseback Riding	560	150	410	690	210	480	1,020	210	810	1,470	210	1,260
Total Miles of Trail	4,030	460	3,570	5,310	560	4,750	7,670	560	7,110	10,690	560	10,130
Total Needs for New Recreation Lands (Acres)												
Class I			17,300			38,040			88,500			149,200
Class II			42,200			74,000			144,400			238,000
Total Land Needs			59,500			112,040			232,900			387,200
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			29,500			53,300			106,400			176,900
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	170,301			230,932			348,705			497,055		
For all water-oriented recreation activities (1000s)	44,457			61,836			93,124			134,841		

(5) Pewaukee Lake Area, Waukesha County, Wisconsin—375 acres
(6) Dutchman Lake Area, Waukesha County, Wisconsin—300 acres
(7) Carpenterville Woods Area, Kane County, Illinois—1,200 acres
(8) Big Rock Creek Valley Area, Kane County, Illinois—5,000 acres
(9) South Elgin Pits Area, Kane County, Illinois—1,400 acres
(10) Plainfield Pits Area, Will County, Illinois—2,000 acres
(11) Will County Strip Mine Area, Illinois—8,000 acres
(12) two regional parks in northwest Indiana—4,000 acres
(13) Park Site No. 22, Lake County, Indiana—340 acres
(14) Park Site No. 23, Lake County, Indiana—308 acres
(15) Park Site No. 33, Lake County, Indiana—60 acres

The following miscellaneous items should be given priority during the entire time frame:

(1) provision of additional access sites on Lake Michigan and its tributary streams
(2) reclamation of polluted beach areas along the Lake Michigan shore in and near Milwaukee and Chicago
(3) acquisition of land and development of small impoundments and recreation facilities under Public Law 566
(4) acquisition and development of a recreational corridor along the Little Calumet River, especially in Indiana, that would include trails, day-use, and artificial ski slopes
(5) acquisition and development of 40 district parks and 1,286 community, neighborhood, and block parks, in which some water-oriented activity needs may be satisfied

4.6.5 Planning Subarea 2.3

Planning Subarea 2.3 (Figure 21–65) is located in the southwestern part of Michigan and the northern part of Indiana. It encompasses 25 counties and includes the Grand, Kalamazoo, St. Joseph, and several smaller river systems. This area contains many miles of picturesque Lake Michigan shoreline and numerous lakes. Among several outstanding recreational areas are the Waterloo Recreation Area, Yankee Springs Recreation Area, and the Allegan State Game Area.

Public lands available for recreation in this planning subarea amount to more than 81,000 acres. Federal lands total nearly 14,000 acres, State lands more than 56,000, and county and local lands more than 11,000 acres. Most of this acreage is located in State forests and State, county, and local parks. Water surface available for outdoor recreation is 69,000 acres on the Great Lakes and 106,000 acres on inland lakes.

Total 1970 recreational requirements were estimated to be more than 71 million recreation days, with water-oriented requirements accounting for nearly 21 million. Requirements by 2020 are estimated to increase to 210 million recreation days for all activities, with more than 66 million for water-oriented activities.

4.6.5.1 Estimate of Needs

This planning subarea attracts many people from outside its boundaries for recreation purposes, especially for weekend and vacation uses. Many of these people come from the Chicago and Detroit metropolitan areas and northern Indiana.

(1) Urban Land Needs

This planning subarea contains no large urban center, but does contain numerous urban centers of moderate size, including Grand Rapids, Lansing, Kalamazoo, and South Bend. The greatest developed-facility needs are for playfields, playgrounds, golf courses and, to a lesser extent, picnic areas. These will continue in prominence until 2020.

Total recreational land which should have been acquired and developed to meet urban recreational needs was 11,000 acres in 1970. This will increase to 70,000 acres by 2020.

(2) Nonurban Land Needs

Although this area contains a number of large general recreational areas, the need for State and regional facilities will continue to increase. Based on requirement, supply, and needs analysis, the need for general recreational land was nearly 21,000 acres in 1970. This is projected to increase to 150,000 acres by 2020.

Recreational facilities in this area receive heavy impact from the Detroit area on the east and the Chicago and Gary-Hammond areas on the west. People in numerous other urban areas contribute heavily toward recreational demand for overnight and weekend facilities.

(3) Total Land Needed for Recreation

Land that should be acquired to meet recreational needs in this planning subarea will increase from 33,000 acres in 1970 to almost

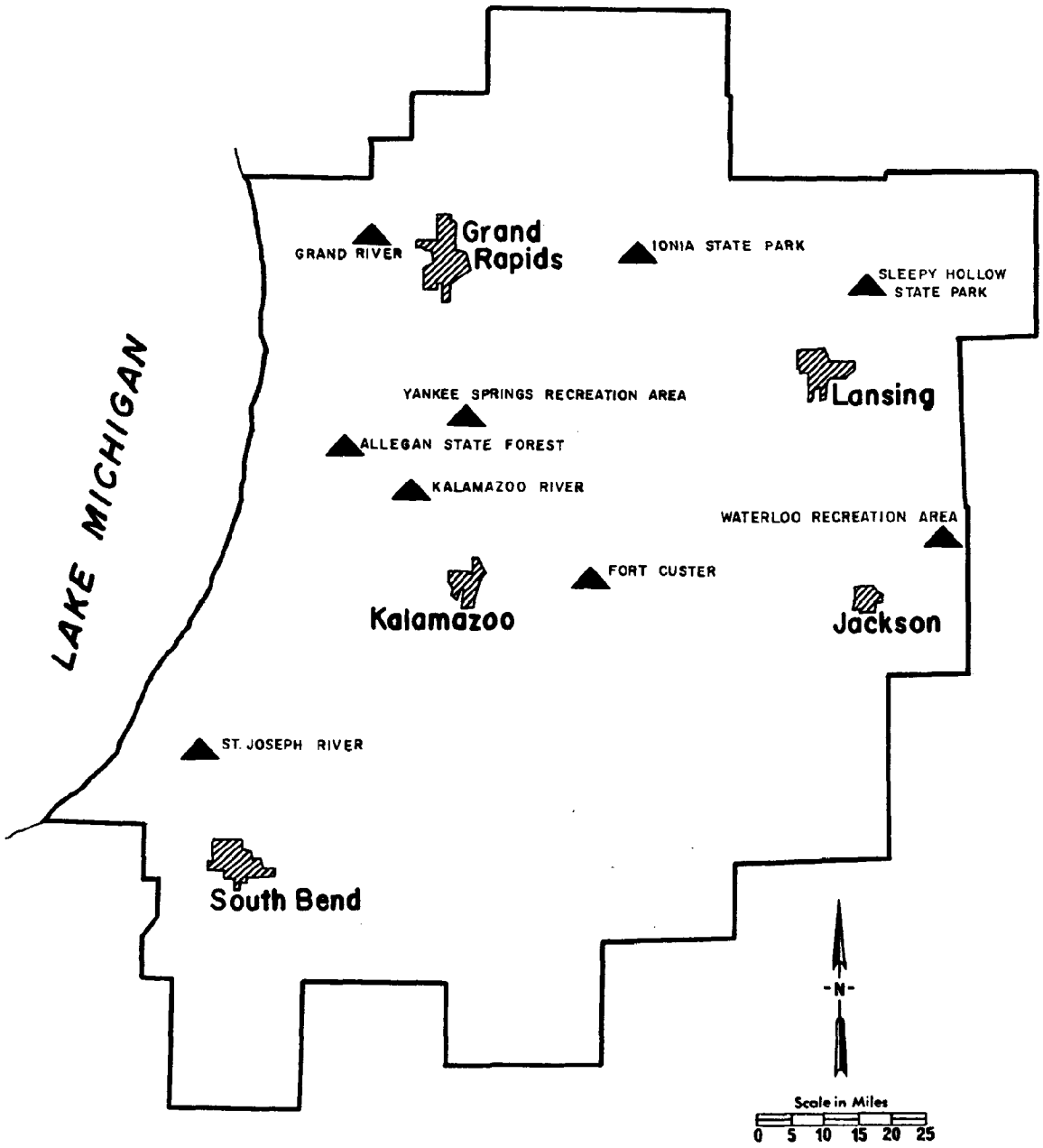


FIGURE 21–65 Reference Map for Planning Subarea 2.3. Inadequate information prohibited the location of all areas identified in text of report.

220,000 acres in 2020. Limited quantities of land already in public ownership could accommodate additional recreational development. These areas include Allegan State Game Area, the Fort Custer, Waterloo, and Ionia Recreation Areas, and several of the new State parks. Table 21–27 portrays recreational requirements, supply, and needs by activity for Planning Subarea 2.3 for each of the target years.

(4) Water Needs

Based on the assumption that all existing waters are usable to capacity, there was no need for additional water surface in 1970. A need of 42,000 acres by 1980 increases to more than 400,000 acres of water surface by 2020.

TABLE 21-27 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 2.3

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	370	320	50	540	320	220	850	320	530	1,240	320	920
Picnicking	2,130	950	1,180	2,710	950	1,760	3,760	950	2,810	5,270	950	4,320
Camping	1,350	1,180	170	2,160	1,190	970	3,600	1,190	2,410	5,750	1,190	4,560
Parking (General)	770	340	430	1,060	340	720	1,620	340	1,280	2,340	340	2,000
Parking (Boats & Water-Skiing)	620	360	260	920	360	560	1,510	360	1,150	2,330	360	1,970
Subtotal	5,240	3,150	2,090	7,390	3,160	4,230	11,340	3,160	8,180	16,930	3,160	13,770
Acres of Developed Land for Other Summer Activities												
Playfields	6,510	2,850	3,660	9,740	2,850	6,890	17,250	2,850	14,400	25,600	2,850	22,750
Golf	11,000	4,600	6,400	16,300	4,600	11,700	28,500	4,600	23,900	42,660	4,600	38,060
Subtotal	17,510	7,450	10,060	26,040	7,450	18,590	45,750	7,450	38,300	68,260	7,450	60,810
Acres of Developed Land for Winter Activities												
Snow Skiing	970	50	920	1,050	50	1,000	1,350	50	1,300	1,760	50	1,710
Sledding	1,180	0	1,180	1,530	0	1,530	2,470	0	2,470	3,980	0	3,980
Ice Skating	90	20	70	150	20	130	240	20	220	380	20	360
Subtotal	2,240	70	2,170	2,730	70	2,660	4,060	70	3,990	6,120	70	6,050
Total Acres of Developed Land	24,990	10,670	14,320	36,160	10,680	25,480	61,150	10,680	50,470	91,310	10,680	80,630
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	143,000	172,000	0	225,000	172,000	53,000	373,000	172,000	201,000	590,000	172,000	418,000
Miles of Trails												
Hiking & Nature Walks	550	120	430	870	120	750	1,390	120	1,270	2,030	120	1,910
Bicycling	1,080	20	1,060	1,300	20	1,280	1,820	20	1,800	2,500	20	2,480
Horseback Riding	260	40	220	330	40	290	500	40	460	720	40	680
Total Miles of Trail	1,890	180	1,710	2,500	180	2,320	3,710	180	3,530	5,250	180	5,070
Total Needs for New Recreation Lands (Acres)												
Class I			11,320			20,600			42,560			69,520
Class II			21,300			43,800			90,300			150,000
Total Land Needs			32,620			64,400			132,860			219,520
Total Needs for New Water-Oriented Recreation Lands (Acres)												
Total Water-Oriented Land Needs			10,500			21,500			47,900			85,100
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	71,452			96,681			145,248			210,932		
For water-oriented recreation activities (1000s)	20,619			29,096			44,826			66,334		

These figures are based on the provision of sufficient water surface to satisfy requirements for water-skiing and boating.

4.6.5.2 Additional Objectives

One immediate objective must be development of land to meet this planning subarea's urban needs. Because facilities should be within easy reach of those who use them, acquisition and development of land must be in or near urban centers.

Needs for extensively developed land should be met through both acquisition and more intensive improvement of existing public land through 2020.

4.6.5.3 Problems

Many problems presented in Subsection 4.5 also apply to this planning subarea. More important, however, is the strong pressure created on the area's recreational facilities by travelers into or through the planning subarea from other places. People from the Gary-Hammond and South Chicago areas travel into or across this area as they move along the eastern Lake Michigan shore seeking recreational opportunities. Those traveling westward from the Detroit area move into the eastern portion of the planning subarea. This results in higher per-facility demand than might be expected from the native population of the area.

4.6.5.4 Suggestions for Future Action

There are a number of underdeveloped areas of land in this planning subarea. The Allegan State Game Area contains more than 40,000 acres of land with only a few recreational facilities. The Waterloo, Ionia, Fort Custer, and Yankee Springs Recreation Areas contain more than 26,000 acres (Figure 21–66). Even though there is significant development in several of these areas, they could support a substantial increase in recreational facilities without adverse effect on the area as a whole.

Similarly, several State and county parks contain sufficient buffer lands for increased development without seriously damaging their aesthetic settings. Assuming an average 15 percent as the optimal development level for State and county parks, these areas are underdeveloped at the present.

There are 115,404 acres of State game and

Courtesy of Michigan Department of Natural Resources

FIGURE 21–66 Yankee Springs Recreation Area. This area offers miles of hiking trails through picturesque woodlands.

wildlife areas within the Michigan portion of Planning Subarea 2.3. It may be necessary to utilize these public lands more fully in the near future, and to provide recreational opportunities for the general public compatible with hunting and fishing. Development of other recreational areas to meet remaining needs will involve the acquisition of new lands and the exportation of a part of the area's recreational requirements to places north of this planning subarea.

There are three primary ways of providing opportunities for water-oriented recreational opportunities in this area—the acquisition and development of flood plains, improvement of Lake Michigan shoreline, and the development of reservoir sites.

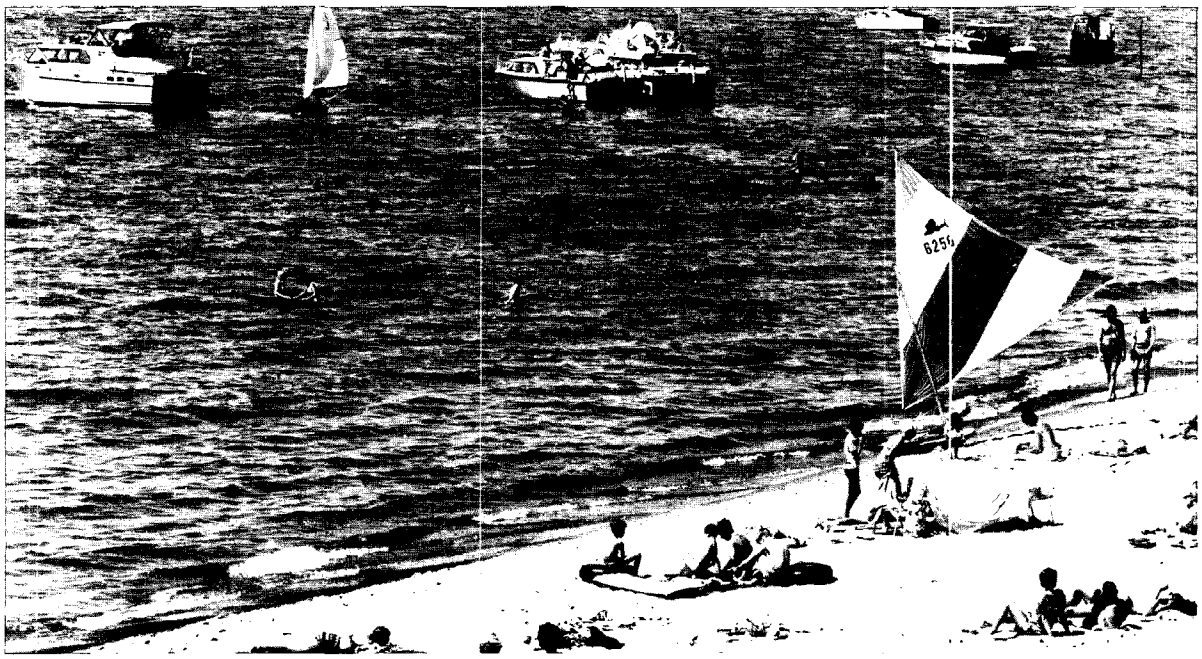
Extensive areas of flood plain adjacent to the Grand, Kalamazoo, and St. Joseph Rivers and their principal tributaries have high potential for recreational development. While flood plains and adjacent rolling land would provide little water-surface area, they have potential for the development of a wide range of activities, especially picnicking, camping, nature study, and hiking.

Several hundred acres of Lake Michigan beach are of sufficient size to warrant consideration of development for public use (Figure 21–67). There are problems in the acquisition of such areas. Some areas, fragmented into small tracts that have been developed either with summer cottages or year-around residences, are very expensive and difficult to acquire. With sufficient back-up lands, these areas could provide excellent opportunities for swimming, camping, picnicking, nature study, and hiking. Boating opportunities are occasionally limited on Lake Michigan because of weather hazards.

Construction of reservoirs either for single-purpose recreational or for multiple-purpose uses offers a third major method of providing recreational opportunities in this planning subarea. There are numerous sites in all of the river basins where reservoirs could be constructed to satisfy a portion of recreational needs.

Two possibilities include the Sandstone Reservoir, eight miles northwest of Jackson, Michigan, and the Doan Creek Reservoir, ten miles southeast of Lansing, Michigan. Both of these would be located on tributaries of the Grand River and could provide a substantial amount of recreational opportunity.

Because of the large number of recreational needs, a Level B study should be conducted in all of this planning subarea, except the Grand



Courtesy of Michigan Tourist Council

FIGURE 21–67 Recreation on Lake Michigan. Lake Michigan's eastern shoreline offers outstanding opportunities for swimming, boating, and sunbathing.

River basin, which has been studied to evaluate recreational potentials and problems in greater detail than this study.

4.6.5.5 Plan Design

For nearly all Class I type recreational developments, new lands will have to be acquired in and near urban areas. These will have to be developed to their fullest capacity to satisfy urban needs.

Where they are available near urban areas, flood plains and adjacent rolling upland should be acquired for recreational development. They should be extended as far as possible into urban areas to provide easy access to urban residents.

A number of local parks in rural or small urban areas could support additional development for day-use activities. These should be developed as necessary to meet local needs.

To meet needs for Class II recreational areas, existing publicly owned lands which are currently underdeveloped should be developed to optimal levels. It was estimated that 1,000 additional acres of developed land could be accommodated on existing publicly owned land.

The Michigan Outdoor Recreation Plan of March 1, 1967[21] lists several State parks which are in the process of being acquired or developed. Among these are the Sleepy Hollow State Park and the Ionia Recreation Area. Other State parks and recreation areas which have additional undeveloped potential, particularly the Fort Custer, Waterloo, and Yankee Springs Recreation Areas, should be expanded to optimal capacity.

New lands will have to be acquired in the planning subarea to satisfy many recreational needs.

A portion of the North Country Trail, a component of a nationwide system of trails, is proposed to traverse this area. If established, it would provide many opportunities for hiking and nature study. Others could be provided by acquisition and development of access sites on lakes and streams where present development is inadequate.

The following elements should be given special priority for acquisition and development between 1970 and 1980:

(1) twenty miles of Grand River Valley—6000 acres

(2) twenty miles of St. Joseph River Valley—6000 acres

(3) ten miles of Kalamazoo River Valley—3000 acres

(4) Lake Michigan shore—2000 acres

(5) two new regional parks—2000 acres each

The following elements should be given priority for acquisition and development during the 1980–2000 time frame:

(1) thirty miles of the Grand River Valley—9000 acres

(2) twenty miles of the St. Joseph River Valley—6000 acres

(3) ten miles of the Kalamazoo River Valley—3000 acres

(4) Lake Michigan shore—2000 acres

(5) Sandstone Creek Reservoir—4000 acres

(6) new regional park—2000 acres

These items should be given priority during 2000–2020:

(1) thirty miles of the Grand River Valley—6000 acres

(2) twenty miles of the Kalamazoo River Valley—6000 acres

(3) twenty miles of the St. Joseph River Valley—6000 acres

(4) new regional parks—three of 2000 acres each

(5) Lake Michigan shore—3000 acres

The following items should be considered during the entire target time:

(1) the provision of access sites in suitable places on Lake Michigan, its tributary streams, and inland lakes

(2) the acquisition of land and development of small impoundments and recreational facilities

The sum of this proposed recreation development will still fall far short of meeting needs if demand develops as projected. A substantial part of the needs may have to be satisfied in some other area where there are greater opportunities for development of recreational facilities.

4.6.6 Planning Subarea 2.4

Planning Subarea 2.4 (Figure 21–68) is located entirely within the State of Michigan. It contains counties in both the Lower and Upper Peninsulas. This area possesses many high quality recreational areas, including Sleeping Bear Dunes and Grand Traverse Bay and its adjacent shoreline. Large areas of public forest lands are also located here, including the Manistee and Hiawatha National Forests and a number of State forests. Pere Marquette River is being recommended as a potential addition to the national Wild and Scenic Rivers

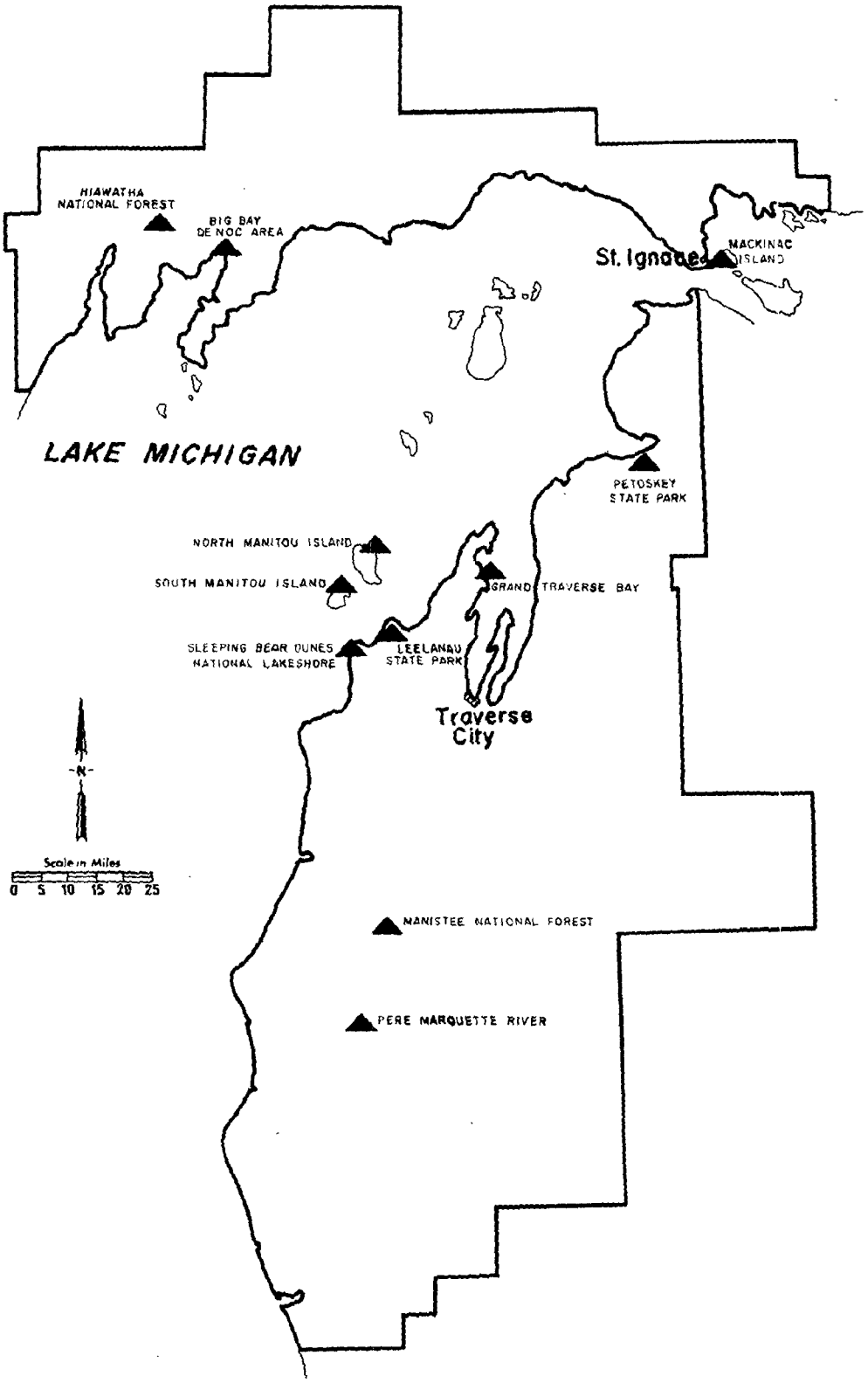


FIGURE 21–68 Reference Map for Planning Subarea 2.4. Inadequate information prohibited the location of all areas identified in text of report.

System. The Big Bay de Noc area of the Upper Peninsula is important both as a waterfowl area and as an area of significant aesthetic values. The area also is noted for its many winter recreational activities (Figure 21–69).

Gross land available for recreation in this planning subarea is 2,300,000 acres, most of it divided evenly between Federal and State ownership. In addition, 228,000 acres of inland water surface and 451,000 acres of Lake Michigan water surface are available.

The total 1970 recreational requirement was more than 18,000,000 recreation days, with more than 5,000,000 recreation days of water-oriented activities. By 2020, these requirements are expected to increase to 51,000,000 total recreation days, of which 16,000,000 are water-oriented.

4.6.6.1 Estimate of Needs

This planning subarea attracts many people from outside its boundaries, especially for weekend and vacation uses. Most of these people come from southern Michigan, northwestern Ohio, northern Indiana, and the Chicago area. While resident population for this planning subarea was projected as approximately 547,000 by 1980, the effective population (that projected to seek recreational opportunities in the area) is estimated to be nearly 800,000 by 1980.

(1) Urban Land Needs

Although this planning subarea does not contain large cities, there are numerous small urban places, including Muskegon, Traverse City, Cadillac, and Escanaba. Approximately one-half of total developed acreage needs are allocated to the urban population.

Total recreational land which should have been acquired and developed to meet urban recreational needs was more than 5,400 acres in 1970. This figure will grow to more than 21,000 acres by 2020. The greatest developed-facility acreage need is for playfields, while needs for golf courses are nearly as great.

(2) Nonurban Land Needs

There appears to be no developed-acreage need for picnicking until 1980, or for swimming beaches or camping until 2000. However, the State of Michigan plans to develop more than 16,000 campsites in this planning subarea by 1976, which would more than double the 1966

Courtesy of U.S. Department of Agriculture

Courtesy of Michigan Tourist Council

FIGURE 21–69 Winter Sports in Michigan. Schuss Mountain near Mancelona, Michigan, is only one of the many winter ski areas in the Great Lakes Region. Heavy winter snowfall makes western Michigan a popular snowmobiling area.

supply. In addition, privately owned campgrounds are increasing in quantity. Apparently, campers are willing to travel longer than the standard travel times used in this study. The additional time permits them to move northward from Planning Subareas 2.3 and 4.1 into Planning Subarea 2.4, where large acreages of land in public ownership are available for camping and related activities.

Nonurban developed-acreage needs amounted to 1,360 acres in 1970. This is projected to increase to more than 8,300 acres by 2020. It is estimated that 50 percent of this amount can be satisfied on existing publicly owned lands. Therefore, new lands needed for nonurban recreation amounted to 4,500 acres in 1970 and are projected to reach 27,700 acres by 2020.

(3) Total Land Needed for Recreation

Land necessary to meet the recreational needs of this planning subarea will grow from 9,900 acres in 1970 to nearly 49,000 acres in 2020. Substantial quantities are already in public ownership and need only be developed. Table 21–29 portrays recreational requirements, supply, and needs by activity for Planning Subarea 2.4 for each of the target years.

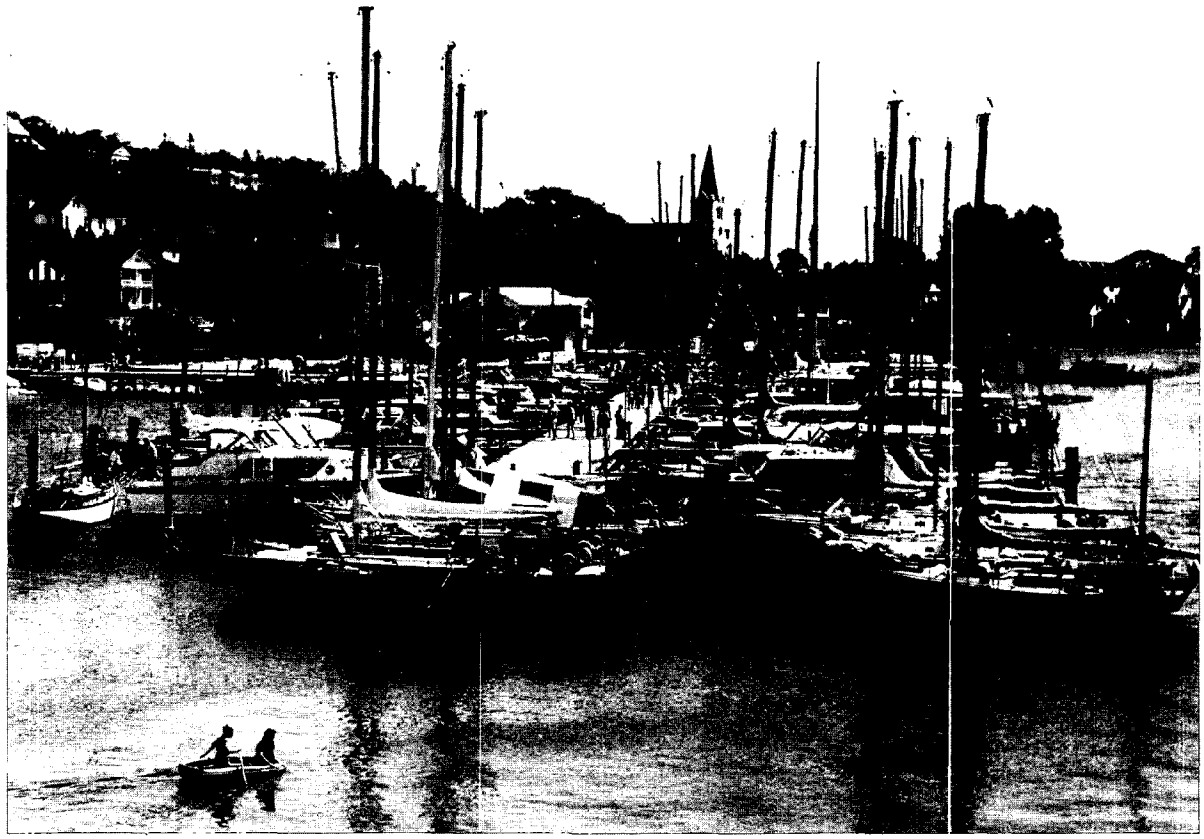
In some areas where ownership of land is limited and where there is need for more development, additional lands may have to be acquired. In its State Park Ten-Year Program,[22] developed in 1965, the State of Michigan proposed to acquire an additional 2,485 acres for recreational development.

(4) Water Needs

No water needs are evident in this planning subarea. It will probably be necessary to develop additional public access to existing waters in the rivers and lakes. More harbors of refuge on Lake Michigan will greatly increase its potential use (Figure 21–70).

4.6.6.2 Additional Objectives

In addition to the general objectives listed in Subsection 4.1, an immediate objective must be the development of land to meet this



Courtesy of Michigan Tourist Council

FIGURE 21–70 Mackinac Island. The area around Mackinac Island is very popular for boating.

planning subarea's urban demands. An integral consideration is that facilities must be within easy reach of those who use them. Thus, acquisition and development of land must be in or near urban centers.

Needs for extensively developed land should be met through both acquisition and more intensive development of existing public land through 2020.

4.6.6.3 Problems

There are three problems peculiar to this planning subarea. Some of the area experiences adverse economic conditions which reduce the ability of the private sector to provide substantial input in developing recreational facilities. Many existing facilities are in poor repair, and therefore, unable to compete vigorously with developments in other major recreational areas.

Second, while Interstate Route I–75 traverses the center of the State north and south, routes extending to the west from this route are inadequate to move recreationists into many areas where opportunities could be developed.

Third, sand and gravel mining of the Lake Michigan dune areas has seriously altered or destroyed some of the dunes and their associated vegetation. Under present Michigan Department of Natural Resources policy, certain State owned lands may be leased for mineral recovery operations, including sand and gravel mining. Some sand dunes in this planning subarea have already been leased for this purpose. Certain privately owned dune areas are also being exploited for these purposes. Areas with important natural and scenic values should be identified and protected from further sand mining. In certain instances, controlling interests in valuable private sand dune areas could be acquired and managed by the State of Michigan.

4.6.6.4 Suggestions for Future Action

There are large acreages of underdeveloped State and Federal lands in this planning subarea. The State of Michigan owns nearly 1,323,000 acres of forest land, while the Hiawatha and Manistee National Forests contain an additional 511,000 and 480,000 acres. Because of the availability of such large acreages for increased development, it was assumed that 50 percent of Type II needs could be met on these lands. Based on U.S. Forest Service data that provide potential levels of development, there are approximately 7,200 acres in the Hiawatha and 5,900 acres in the Manistee National Forests that could be developed for intensive recreational use. Using a developmental level of two-tenths of one percent provided by Michigan, another 2,600 acres is estimated to be available for intensive recreational use on State forest land.

Several State and county parks contain sufficient buffer lands for increased development without seriously damaging the aesthetic setting of the area. At an optimal development level of 15 percent for State and county parks, these public recreational areas are underdeveloped at present.

The numerous lakes in this area should be examined for their potential as scenic lakes. Those that qualify should be protected and maintained in their natural state in the same manner as wild or scenic rivers.

There are two major trails that, when completed, will traverse this planning subarea. The existing Shore-to-Shore Trail, developed by the State of Michigan, extends in an east-west direction through Kalkaska, Grand Traverse, Benzie, and Leelanau Counties, with a spur trail extending into Wexford County. The North Country Trail, as an addition to the national trails system, is proposed to extend in a north-south direction through the counties adjacent to Lake Michigan. Scenic areas and those with recreational potential should be tied into these major trail systems with a system of spur trails for hiking and horseback riding.

The Sleeping Bear Dunes National Lakeshore, authorized in 1970 and currently being acquired, will contain approximately 46,000 acres in Benzie and Leelanau Counties, 31 miles of Lake Michigan mainland shoreline, 13 miles of South Manitou Island shoreline, and 22.5 miles of North Manitou Island shoreline. According to Public Law 91–479, the Secretary of the Interior

> shall prepare and implement a land and water use management plan, which shall include specific provisions for (1) development of facilities to provide the benefits of public recreation; (2) protection of scenic, scientific, and historic features contributing to public enjoyment; and (3) such protection, management, and utilization of renewable natural resources as in the judgment of the Secretary is consistent with, and will further the purpose of, public recreation and protection of scenic, scientific, and historic features contributing to public enjoyment.[52]

Such recreational developments would help meet some of the needs for camping, picnick-

ing, swimming, hiking, sightseeing, and other activities.

There are almost 5,100 miles of snowmobile trails in this area.[23] Most of these trails are publicly owned, with local governments owning approximately 87 percent of the total; the State of Michigan, 6 percent; the Federal government, 1 percent; and the private sector owning the remaining 6 percent. Extensive holdings of public forests, both State and Federal, plus the private sector, should be able to support additional opportunities for such trails.

Estuarine areas along Lake Michigan should be preserved and managed as a habitat for fish and wildlife. Recreational potential should be developed to the extent that it is compatible with fish and wildlife uses.

This planning subarea possesses several rivers with attributes that could qualify them for scenic or natural river status at the State or Federal level. These include the Pere Marquette, Manistee, Pine, White Fish, Muskegon, Manistique, Carp, Little Manistee, and Escanaba Rivers.

The shores of Lake Michigan contain more than 900 acres (154 miles) of beaches, approximately 290 acres (32 miles) of which are publicly owned. It is estimated that nearly 500 more acres (100 miles) have recreational potential.

Other areas, on or adjacent to lakeshores, streams, and other points of interest, have potential for development as regional or community parks.

4.6.6.5 Plan Design

Recreational facilities included in the Manistee and Hiawatha National Forests' 5-year recreation plans[46] are given in Table 21–28.

For all Class I type recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea. Existing public lands, currently underdeveloped, should be developed to their optimal potential.

The Michigan Outdoor Recreation Plan of March 1, 1967,[21] lists several State parks which are in the process of being developed. Included within Planning Subarea 2.4 are Leelanau and Petoskey. Acquisition and development of these parks will help meet the growing recreational demand. Other State parks with additional potential for development should be expanded to their optimal capacities.

In addition to these State areas, three previously mentioned areas of national significance should be established or administered in accordance with the legislative intent—the Sleeping Bear Dunes National Lakeshore, the proposed Pere Marquette Scenic River, and the proposed North Country Trail.

In addition to the above elements, new lands should be acquired in the planning subarea to satisfy remaining needs. The following elements are proposed for recreational development.

These items should be given priority for acquisition and development during 1970–1980:

(1) Lake Michigan shore—2,000 acres
(2) national forest development
(3) scenic rivers—50 miles

The following elements should be given priority for acquisition and development during 1980–2000:

(1) Lake Michigan shore—2,000 acres
(2) national and State forest development
(3) new regional parks—two of 2,000 acres each
(4) scenic rivers—100 miles

The following should be considered for acquisition and development during 2000–2020:

(1) Lake Michigan shore—2,000 acres
(2) national and State forest development
(3) new regional parks—two of 2,000 acres each
(4) scenic rivers—100 miles

These miscellaneous items should be given attention through the entire 1970–2020 period:

(1) the provision of access sites in suitable places on Lake Michigan, its tributary streams, and inland lakes
(2) development of additional harbors of refuge
(3) evaluation and classification of those lakes that have potential to be considered for preservation in a natural or scenic lake sys-

TABLE 21–28 Planned Recreation Facilities, Manistee and Hiawatha National Forests, Planning Subarea 2.4

Facility	No. of Sites	Persons Accomodated At One Time
Camping	111	610
Swimming	1	100
Boating	8	2,105
Picnic	40	211
Canoe Trails	100 miles	80
Hiking Trails	30 miles	300

tem. Those that qualify should be protected from that development which detracts from their pristine character.

(4) extension of the trail systems
(5) development of compatible recreational facilities on public hunting lands

TABLE 21-29 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 2.4

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	100	170	0	150	170	0	240	170	70	350	170	180
Picnicking	1,530	1,500	30	1,910	1,500	410	2,640	1,500	1,140	3,650	1,500	2,150
Camping	620	1,300	0	990	1,300	0	1,630	1,300	330	2,580	1,300	1,280
Parking (General)	220	60	160	290	60	230	460	60	400	660	60	600
Parking (Boats & water-skiing)	270	70	200	410	70	340	670	70	600	1,010	70	940
Subtotal	2,740	3,100	390	3,750	3,100	980	5,640	3,100	2,540	8,250	3,100	5,150
Acres of Developed Land for Other Summer Activities												
Playfields	2,180	70	2,110	3,130	70	3,060	4,990	70	4,920	7,610	70	7,540
Golf	3,160	190	2,970	4,240	190	4,050	8,020	190	7,830	11,990	190	11,800
Subtotal	5,340	260	5,080	7,370	260	7,110	13,010	260	12,750	19,600	260	19,340
Acres of Developed Land for Winter Activities												
Snow Skiing	280	200	80	300	200	100	380	200	180	480	200	280
Sledding	340	0	340	430	0	430	700	0	700	1,100	0	1,100
Ice Skating	30	20	10	40	20	20	70	20	50	210	20	190
Subtotal	650	220	430	770	220	550	1,150	220	930	1,790	220	1,570
Total Acres of Developed Land	8,730	3,580	5,900	11,890	3,580	8,640	19,800	3,580	16,220	29,640	3,580	26,060
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	88,000	679,000	0	131,000	679,000	0	229,000	679,000	0	334,000	679,000	0
Miles of Trails												
Hiking & Nature Walks	300	60	240	480	60	420	750	60	690	1,180	60	1,120
Bicycling	310	80	230	370	80	290	510	80	430	700	80	620
Horseback Riding	80	80	0	90	80	10	140	80	60	200	80	120
Total Miles of Trail	690	220	470	940	220	720	1,400	220	1,180	2,080	220	1,860
Total Needs for New Lands for Recreation (Acres)												
Class I			5,410			7,680			13,830			21,000
Class II			4,500			7,700			15,500			27,700
Total Land Needs			9,910			15,380			29,330			48,700
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			1,330			3,270			8,200			17,200
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	18,214			24,366			36,289			51,360		
For water-oriented recreation activities (1000s)	5,255			7,348			11,199			16,466		

4.6.7 Planning Subarea 3.1

Planning Subarea 3.1 (Figure 21–71) occupies the northeastern part of Michigan's Lower Peninsula and encompasses eleven counties from Saginaw Bay north to the Straits of Mackinac.

Outstanding recreational features of this area include extensive forests, many inland lakes and streams, topography which lends itself to winter sports, and in the northern portion, the last vestiges of an undeveloped Lake Huron shoreline. Principal streams include the Rifle, Au Sable, Pine, Thunder Bay, Black, Pigeon, and Sturgeon Rivers.

Soil and climate do not encourage intensive agriculture. Timber is one of the area's major products.

Urban development is minimal and strongly related to recreation. The principal cities are Alpena (the largest, with nearly 15,000 people), Cheboygan, Gaylord, and Standish. The Bay City and Saginaw SMSAs, with a combined population of 334,415 in 1970, lie within 50 miles of the southern boundary of this planning subarea.

Gross land available for recreation in this planning subarea is 1,691,000 acres. Of this total, 1,666,000 acres are in State and national forests and 25,000 acres in State and local parks and water access areas. Great Lakes and inland water surfaces contribute another 178,000 acres and 111,000 acres, respectively.

The total annual requirement for all recreational activities in 1970 was 7.7 million recreation days. This is projected to increase to more than 21 million recreation days by 2020. The water-oriented activity requirements in 1970 were two million recreation days, and are expected to increase to more than six million recreation days by 2020.

4.6.7.1 Estimate of Needs

(1) Urban

Although there are no urban areas which qualify as SMSAs in Planning Subarea 3.1, there are some needs in the smaller urban areas, and in cities just to the south of this planning subarea. Playfields represented the greatest developed-facility acreage needs in 1970. These urban-oriented facilities remain the largest acreage need through 2020. A large acreage need for golf courses is expected by that year. Swimming beach acreage in this area appears adequate to the year 1980. There was a need for 100 miles of developed bicycle trails in 1970 which is projected to reach 250 miles by 2020. Needs for Class I recreational lands were 2,200 acres in 1970. This figure will increase to more than 10,000 acres by 2020.

(2) Nonurban

Estimates indicate an insufficient supply of swimming beaches and picnicking facilities beyond 1980, and insufficient camping facilities after 2020. The Michigan Outdoor Recreation Plan[20] showed a prorated need for development of more than 2,300 campsites and 3,400 parking spaces between 1965 and 1975. It also proposed the acquisition of 2,300 additional acres of land.

This study does not adequately consider travel patterns from the Detroit metropolitan area and other large cities to the south. A significant number of people traveling to this area for recreational purposes are willing to travel more than 150 miles from urban areas in the south for normal summer weekend use. Needs for nonurban recreational lands (Class II), 2,500 acres in 1970, are projected to increase to nearly 12,000 acres by 2020.

(3) Total Land Needed for Recreation

It is estimated that the total amount of land which must be acquired and developed will grow from 4,700 acres in 1970 to nearly 22,000 acres by 2020, assuming that 50 percent of the needs for Class II recreational development can be accommodated on State and Federal forest lands. Table 21–30 portrays recreational requirements, supply, and needs by activity for Planning Subarea 3.1 for each of the target years.

(4) Water Needs

The water supply in this planning subarea appears adequate to meet present and future demands for boating activities.

4.6.7.2 Problems

Many problems presented in Subsection 4.5 are applicable here. Additionally, some of this planning subarea experiences adverse economic conditions which reduce the ability of the private sector to provide substantial input to the development of recreational opportunities. Existing facilities have been poorly maintained and are not able to compete vigorously with other major recreational areas.

A second specific problem in this area is one of road layout. While Interstate Route I–75 traverses the center of the State north and south, roads extending east from this route are inadequate to carry recreationists into

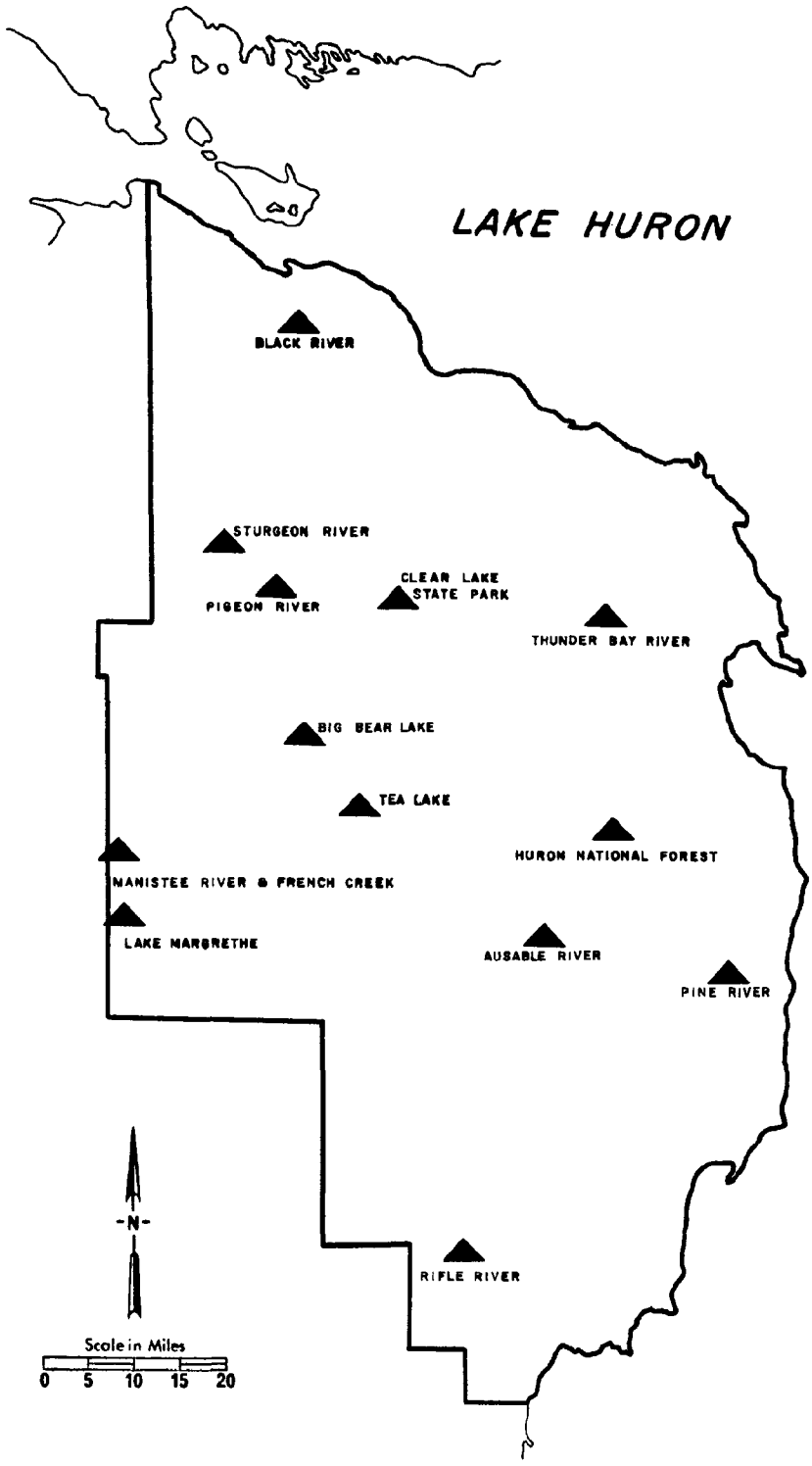


FIGURE 21–71 Reference Map for Planning Subarea 3.1. Inadequate information prohibited the location of all areas identified in text of report.

many areas where opportunities could be developed.

Third, this planning subarea receives a disproportionate share of its projected recreational use from urbanized areas to the south. It is expected that inadequate recreational resources in the southern planning subareas, coupled with the northerly travel pattern that will be stimulated by the Interstate Highway System, will result in a rapidly increasing recreational demand in this area.

4.6.7.3 Suggestions for Future Action

Large acreages of either undeveloped or underdeveloped public lands are present in this planning subarea. Of the 1.7 million acres in public ownership, 417,000 acres are in national forests and 1,248,000 in State forests. Based on U.S. Forest Service[46] data, 5,000 acres of land could be developed for recreational use in the Huron National Forest. At a developmental level of two-tenths of one percent, State forests could provide an additional 2,500 acres for recreational development. Optimal usage may require the purchase of additional lake and stream frontage. In addition, several State parks and recreational areas could support increased development. Because of the availability of large acreages for potential development, it was assumed that 50 percent of all Class II needs could be met on publicly owned lands.

Other areas that should be considered for recreational use include the valleys of the Rifle, Au Sable, Thunder Bay, and Black Rivers and their tributaries. Small stream valleys should be considered for development where they are of adequate size and quality. It appears that between 100 and 150 miles of valley have potential for recreational development. The Au Sable, Black, Pine, Thunder Bay, Presque Isle, and Rifle Rivers are possible additions to a scenic or natural river system.

A number of privately owned beaches along the Lake Huron shore in Alcona, Arenac, Cheboygan, Iosco, and Presque Isle Counties have some potential for intensive development. Based on the International Joint Commission (IJC) study,[16] most of these beaches are of average quality. Their total length exceeds 45 miles and they contain approximately 400 acres. Many have some residential development within 300 feet of the shoreline. Such development limits the potential of these areas and will increase the cost of acquisition if they are purchased.

Estuarine areas along Lake Huron should be preserved and managed for fish and wildlife habitats, and recreational potential developed only if compatible. Michigan's State Park Ten-Year Program[22] showed a proposed increase of 3,000 acres in six State parks by 1975. The number of State campsites in this planning subarea is programmed to increase to 3,986 in 11 parks by 1975. The program lists potential parks within ten years on presently administered State forest land, including:

(1) Big Bear Lake
(2) Clear Lake
(3) Jones Lake
(4) Lake Margrethe
(5) Tea Lake
(6) Manistee River-French Creek

Additional facilities should be provided as needed on State and national forest lands to provide quality recreation in a natural setting within reasonable travel time of the user.

More opportunities could be provided through development of adequate public access sites on lakes and streams. Such access would be especially beneficial for boating and fishing.

The State has developed several trail routes through this planning subarea. The Shore-to-Shore Trail traverses Iosco, Alcona, Oscoda, and Crawford Counties and continues westward to the Lake Michigan shore. Another trail is being developed from Midland to Mackinaw City. It will cross Crawford, Otsego, and Cheboygan Counties. Scenic areas or those with recreational potential should be tied into major trail systems with a system of spur trails for hiking and horseback riding.

Canoe trails have been developed on the Rifle, Au Sable, Thunder Bay, and Black Rivers. Other streams should be developed for canoeing wherever possible.

More than 600 miles of designated snowmobile trails are listed on public lands in this area.[23] Extensive holdings of public forest, both State and Federal, should be able to support additional trails.

The numerous lakes in this planning subarea should be examined as potential scenic lakes. Those that qualify should be protected and maintained in their natural state.

The private sector has provided substantial recreational opportunities in certain activities, especially camping and snow skiing.

4.6.7.4 Plan Design

For most Class I type recreational develop-

ments, new lands will have to be acquired in and near urban areas throughout the planning subarea. Existing public lands, currently underdeveloped, should be developed more intensively while maintaining as natural a setting as possible.

For Class II type recreational areas, there are two useful alternatives. All existing publicly owned lands, consisting largely of State parks and State and national forests, should be developed to their optimal capacity. It is estimated that these lands can accommodate

TABLE 21-30 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 3.1

Activity	1970			1980			2000			2020		
	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	40	60	0	60	60	0	90	60	30	130	60	70
Picnicking	580	770	0	730	770	0	1,000	770	230	1,370	770	600
Camping	240	1,000	0	380	1,180	0	620	1,180	0	970	1,180	0
Parking(General)	80	210	0	120	250	0	170	250	0	250	250	0
Parking (Boats & Water-Skiing)	110	200	0	160	200	0	250	200	50	470	200	270
Subtotal	1,050	2,240	0	1,450	2,460	0	2,130	2,460	310	3,190	2,460	940
Acres of Developed Land for Other Summer Activities												
Playfields	1,470	10	1,460	2,180	10	2,170	3,710	10	3,700	5,560	10	5,550
Golf	1,200	600	600	1,760	600	1,160	3,040	600	2,440	4,480	600	3,880
Subtotal	2,670	610	2,060	3,940	610	3,330	6,750	610	6,140	10,040	610	9,430
Acres of Developed Land for Winter Activities												
Snow Skiing	110	20	90	120	20	100	150	20	130	180	20	160
Sledding	130	0	130	170	0	170	260	0	260	410	0	410
Ice Skating	10	0	10	20	0	20	30	0	30	40	0	40
Subtotal	250	20	230	310	20	290	440	20	420	630	20	610
Total Acres of Developed Land	3,970	2,870	2,290	5,700	3,090	3,620	9,320	3,090	6,870	13,860	3,090	10,980
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	34,000	289,000	0	49,000	289,000	0	82,000	289,000	0	126,000	289,000	0
Miles of Trails												
Hiking & Nature Walks	120	90	30	190	90	100	290	90	200	420	90	330
Bicycling	120	20	100	140	20	120	200	20	180	270	20	250
Horseback Riding	30	130	0	40	130	0	50	130	0	80	130	0
Total Miles of Trail	270	240	130	370	240	220	540	240	380	770	240	580
Total Needs for New Lands for Recreation (Acres)												
Class I			2,200			3,600			6,600			10,200
Class II			2,500			3,500			6,900			11,600
Total			4,700			7,100			13,500			21,800
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			0			0			1,100			3,100
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	7,700			10,449			15,854			21,591		
For water-oriented recreation activities (1000s)	1,985			2,798			4,238			6,196		

50 percent of needed facilities.

New lands should be acquired and developed in strategic areas. Such settings should be oriented toward the Lake Huron shoreline and several of the larger lakes and streams.

The following should be given priority during the 1970–1980 time period:

(1) State and national forest areas
(2) Lake Huron shore—640 acres
(3) scenic rivers—50 miles

These elements deserve priority for acquisition and development, 1980–2000:

(1) Lake Huron and inland lake shores—2000 acres
(2) State and national forest areas
(3) scenic rivers—100 miles

These elements are needed during 2000–2020:

(1) Lake Huron and inland lake shores—2000 acres
(2) State and national forest areas
(3) new regional parks—two of 2000 acres each
(4) scenic rivers—50 miles

Miscellaneous items that should be considered during the entire period include:

(1) the provision of access sites in suitable places on Lake Huron, its tributary streams and inland lakes
(2) development of additional harbors of refuge
(3) evaluation and classification of lakes with potential as natural or scenic lakes which should be protected
(4) extension of the trail system
(5) development of compatible recreational facilities on public hunting lands

4.6.8 Planning Subarea 3.2

The eleven counties which make up this planning subarea are located in the lower Lake Huron region in the east-central part of the Lower Peninsula (Figure 21–72).

Heavy recreational use is made of river valleys and forested areas in the north, and glacial moraines in the southern portion of the planning subarea. The Tittabawassee, Shiawassee, Flint, and Cass Rivers drain this area. Major cities include Bay City, Midland, Flint, and Saginaw. Nearly 75 percent of the effective population is derived from SMSAs. The forested northern section lends itself well to camping, hunting, and other recreational activities in a natural environment. With the exception of the southern counties, natural lakes are largely absent in this area.

Gross land available for recreation is approximately 11,300 acres. There are also 58,000 acres of State game and wildlife areas and 3,400 acres of national wildlife refuges. In addition, the Great Lakes water surfaces available for recreation amount to 137,000 acres and inland lakes to 24,000 acres.

Total annual recreational requirements in 1970 were more than 31 million recreation days. This is projected to increase to more than 94 million recreation days by 2020. Requirements for water-oriented recreation were slightly more than eight million recreation days in 1970, and are expected to increase to more than 25 million recreation days by 2020.

4.6.8.1 Estimate of Needs

(1) Urban Land Needs

Greatest current need, which will extend through 2020, is for developed facilities usually associated with urban areas, i.e., golf courses and playfields. A need of 100 acres of swimming beach for 1970 will increase to 400 acres by 2020. Needs for Class I recreational lands will increase from 6,700 acres in 1970 to more than 29,000 in 2020.

(2) Nonurban Land Needs

Developed land required to satisfy nonurban needs in 1970 was 1,000 acres, increasing to 5,500 acres by 2020. Needs for camping acreage were estimated to increase from 100 acres in 1970 to nearly 1,700 acres by 2020. Picnicking acreage is expected to grow from 500 acres in 1970 to approximately 1,700 acres in 2020. There is a shortage of trail development in the area. Approximately 460 miles of both bicycle and horse trails were needed in 1970, with foot trail needs of nearly 200 miles. By 2020, trail mileage needs will increase to 930 for bicycling, 260 for horseback riding, and 760 for foot travel. Needs for Class II recreational land are projected to increase from 12,500 acres in 1970 to 54,000 acres in 2020.

(3) Total Land Needed for Recreation

Because relatively little public land is available for more intensive development in this planning subarea, larger acreages must be acquired. More than 19,000 acres were required in 1970, and by 2020 total land needed will approach 84,000 acres. Table 21–31 portrays recreational requirements, supply, and needs by activity for Planning Subarea 3.2 for each of the target years.

(4) Water Needs

Additional surface water is not expected to be needed until 2020. By that year, approximately 70,000 acres of water surface will be needed in this planning subarea.

4.6.8.2 Problems

There was an average of only 10.3 acres of all types of recreation land, exclusive of water surface, available per 1,000 people in this planning subarea in 1964.[57] This relationship has changed very little since that time. The National Recreation and Park Association[59] recommends an average of 10 acres of urban recreational areas, 15 acres of extra urban open space, and 65 acres of large parks, forests, and other open space per 1,000 people. It seems unlikely this standard can be met within the limits of this area.

4.6.8.3 Suggestions for Future Action

Unfortunately, there are now no large acreages of public lands in this planning subarea that can be developed for recreational use. Several State parks could support limited ad-

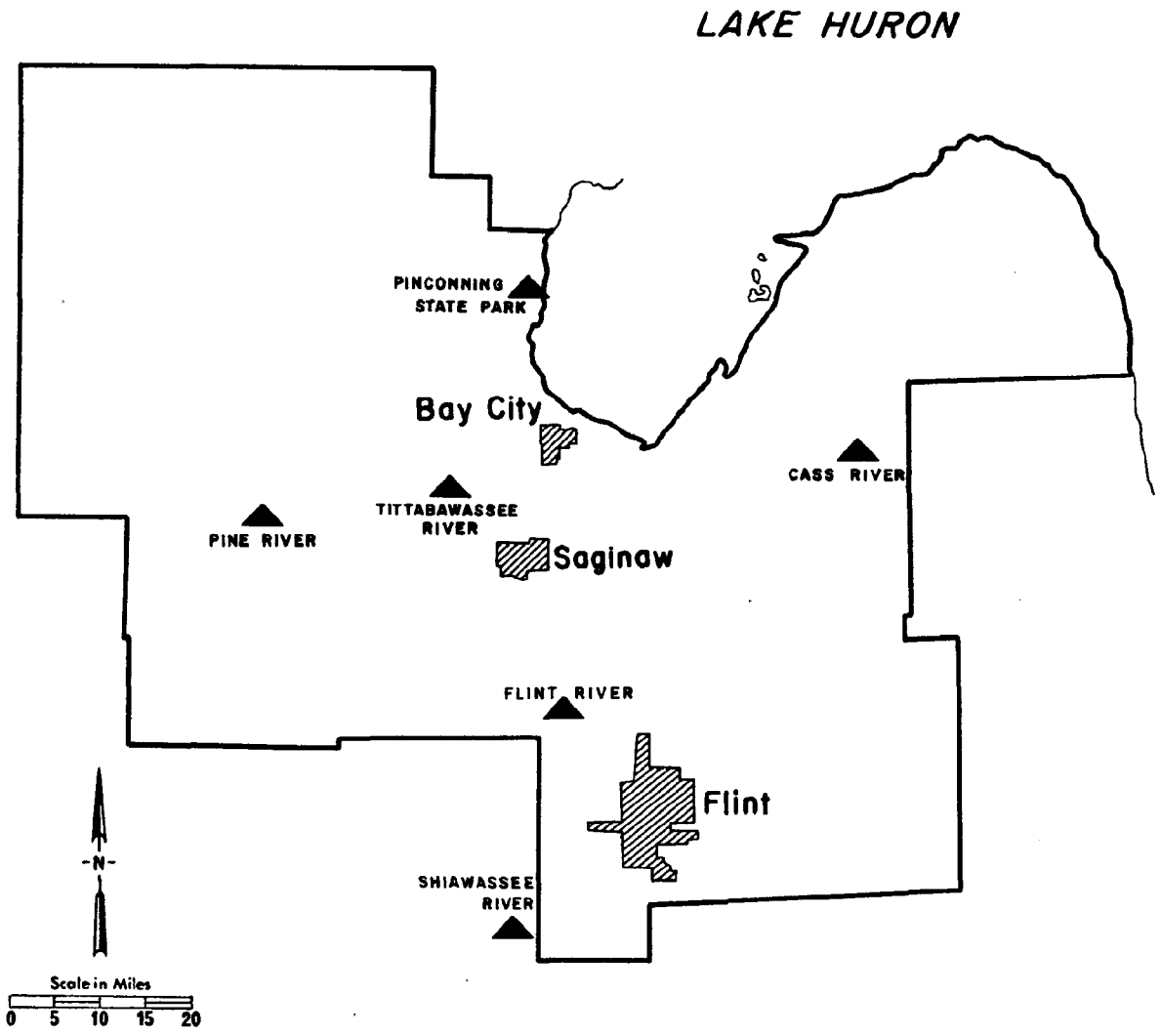


FIGURE 21–72 Reference Map for Planning Subarea 3.2. Inadequate information prohibited the location of all areas identified in text of report.

ditional development. State game and wildlife areas total 58,000 acres. If one-half of one percent of these lands were developed for certain types of recreational use, they could supply 300 acres of developed recreational facilities. In total only 600 acres of developed lands can be supported on existing publicly owned lands.

A significant amount of other resources with recreational potential are present in this planning subarea. These alternatives are set forth here.

Areas that should be considered for recreational use include the valleys of the Shiawassee, Flint, Tittabawassee, and Pine Rivers and their tributaries. Other, smaller stream valleys should be considered where they are of adequate size and quality. Between 100 and 150 miles of valley have this type of potential.

A number of privately owned beaches along the Lake Huron shore in Bay and Huron Counties have some potential for intensive development and use. Based on the IJC study,[16] these beaches are of average quality. Their total length exceeds 20 miles and they contain more than 150 acres. However, a significant part of their length is built up, having cottages within 300 feet of the shoreline. Substantial numbers of these cottages would have to be acquired to develop suitable public beach areas. Lands have been acquired for a new State park at Pinconning, which will include a full range of development.

Impoundments could be constructed for recreational use in numerous places in this planning subarea. These sites have potentials of more than 7,000 acres of surface water. Under present policy, however, if these areas were developed solely for recreation and fish and wildlife use, they probably would have to be funded in large part by State and local interests. Such impoundments can have adverse impact on the trout population.

Estuarine areas and shoreland along Lake Huron should be preserved and managed for fish and wildlife habitats and recreational potential should be developed only if compatible.

Additional recreational opportunities could be provided through development of public access sites on those lakes and streams which presently do not have suitable access. Such access would be especially beneficial for boating and fishing.

Based on 1964 data,[57] the amount of all public recreational lands available within the counties in this planning subarea having major urban centers is less than five acres per 1,000 people. To meet the pressing needs of people residing in such areas, consideration should be given to the improvement of existing centers, construction of new neighborhood multi-purpose community centers, and full utilization of school and other facilities for general recreational and cultural activities. Other improvements should include the acquisition and development of tot-lots, neighborhood playgrounds, and neighborhood and community parks.

A very substantial part of overnight and weekend use has been exported from this planning subarea to the upper part of the Lower Penninsula and to the Upper Peninsula of Michigan and to the Lake Michigan shore on the western side of the State. This trend undoubtedly will continue and may intensify as the southeastern part of the State becomes more heavily populated. These people will seek recreational opportunities largely in Planning Subareas 1.2, 2.4, and 3.1.

The private sector has provided substantial quantities of recreational opportunities in certain activities, especially camping and snow skiing.

4.6.8.4 Plan Design

New lands in and near urban areas will have to be acquired for most Class I type recreational developments throughout the planning subarea. Existing public lands, currently underdeveloped, should be developed more intensively while maintaining as natural a setting as possible.

There are two alternatives for Class II type recreational areas. All existing publicly owned lands, consisting largely of State parks and wildlife areas, should be developed to their optimal capacity. It is assumed that these lands could accommodate 300 additional acres of newly developed facilities by 1980 and 600 acres of such facilities by 2000 and 2020.

New lands will have to be acquired in the planning subarea to satisfy many recreational needs. The following elements are proposed for recreational development.

These areas should be given priority for acquisition and development during the 1970–1980 time period:

(1) approximately 20 miles of stream valleys on the Flint, Tittabawassee, and Shiawassee and their tributaries—3,200 acres

(2) five miles of Lake Huron beaches in Bay and Huron Counties—1,600 acres

(3) two new regional parks on new impoundments—2,000 acres of recreational

lands in each, plus water surface

The following items should be given priority during 1980–2000:

(1) approximately 20 additional miles of stream valleys on the Flint, Tittabawassee, Shiawassee, Pine, Cass, and Chippewa Rivers and their tributaries—3,200 acres

(2) five additional miles of Lake Huron beaches in Bay and Huron Counties—1,600 acres

TABLE 21–31 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 3.2

Activity	1970			1980			2000			2020		
	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	150	50	100	210	50	160	330	50	280	480	50	430
Picnicking	840	340	500	1,060	340	720	1,460	340	1,120	2,020	340	1,680
Camping	530	430	100	850	560	290	1,410	560	850	2,220	560	1,660
Parking (General)	300	200	100	420	250	170	630	250	380	900	250	650
Parking (Boats & water-skiing)	240	60	180	360	60	300	570	50	510	880	60	820
Subtotal	2,060	1,080	980	2,900	1,260	1,640	4,400	1,260	3,140	6,500	1,260	5,240
Acres of Developed Land for Other Summer Activities												
Playfields	2,660	670	1,990	3,960	670	3,290	6,800	670	6,130	10,240	670	9,570
Golf	4,320	460	3,860	6,420	460	5,960	10,060	460	9,600	16,340	460	15,880
Subtotal	6,980	1,130	5,850	10,380	1,130	9,250	16,860	1,130	15,730	26,580	1,130	25,450
Acres of Developed Land for Winter Activities												
Snow Skiing	380	40	340	420	40	380	530	40	490	670	40	630
Sledding	470	0	470	600	0	600	970	0	970	1,530	0	1,530
Ice Skating	40	0	40	60	0	60	90	0	90	150	0	150
Subtotal	890	40	850	1,080	40	1,040	1,590	40	1,550	2,350	40	2,310
Total Acres of Developed Land	9,930	2,250	7,680	14,360	2,430	11,930	22,850	2,430	20,420	35,430	2,430	33,000
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	57,000	161,000	0	89,000	161,000	0	147,000	161,000	0	231,000	161,000	70,000
Miles of Trails												
Hiking & Nature Walks	220	30	190	350	30	320	530	30	500	790	30	760
Bicycling	420	40	380	520	40	480	710	40	670	970	40	930
Horseback Riding	100	20	80	130	20	110	190	20	170	280	20	260
Total Miles of Trail	740	90	650	1,000	90	910	1,430	90	1,340	2,040	90	1,950
Total Needs for New Lands for Recreation (Acres)												
Class I			6,740			10,700			18,200			29,400
Class II			12,500			17,700			32,300			54,000
Total Land Needs			19,240			28,400			50,500			83,400
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			6,500			8,900			16,900			31,000
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	31,197			42,718			65,205			94,443		
For water-oriented recreation activities (1000s)	8,114			11,434			17,825			25,609		

(3) two new regional parks on new impoundments—2,000 acres of recreational land in each, plus water surface

These elements should be acquired and developed during 2000–2020:

(1) approximately 40 additional miles of stream valleys on various streams in the planning subarea—6,400 acres

(2) three additional regional parks on new impoundments—2,000 acres of recreational lands in each, plus water surface

Miscellaneous items to be considered during the entire period include:

(1) the acquisition and construction of additional access sites in suitable places on inland lakes and streams

(2) acquisition and development of additional harbors of refuge and marinas on Lake Huron

(3) acquisition and development of recreational lands on small impoundments constructed under Public Law 566

4.6.9 Planning Subarea 4.1

This planning subarea is located in gently rolling terrain of the western portion of the Lake Erie region. It consists of nine counties in southeastern Michigan (Figure 21–73) and is characterized by a high degree of urbanization and industrialization. More than 90 percent of its effective population is derived from urban areas. Detroit, second largest city in the Great Lakes Region, is the largest city in this planning subarea. Residents of Detroit, Ann Arbor, Pontiac, and other smaller cities exert tremendous recreational pressures.

The recreational potential of this area is limited by urban sprawl and competing land and water uses. Gross land acreage available for recreation is 68,100 acres, most of which is in State, county, and local parks. Inland water areas, primarily in the northwestern portion of the area, and Great Lakes surface area add another 40,000 acres and 151,000 acres to the recreation supply. Major rivers include the Huron, Raisin, and Clinton Rivers.

Total recreational requirements for 1970 were over 85 million recreation days. These are estimated to increase to more than 260 million recreation days by 2020. Water-oriented recreational requirements were estimated to exceed 20 million recreation days in 1970, and are projected to increase to more than 70 million recreation days by 2020.

4.6.9.1 Estimate of Needs

The presence of large population concentrations in Planning Subarea 4.1, coupled with increasing population and income, greater mobility and additional leisure time, means increasing pressure on recreational facilities, especially for the day-use type. To meet these needs, a coordinated, continuous planning and developmental effort by all agencies engaged in the provision of recreational facilities for the public is necessary.

Recreational needs of Detroit residents are not unlike those of other major cities throughout the Region. The greatest needs lie in low-income, densely populated neighborhoods. In these areas there is very little open space for recreation, and people lack the means to travel to recreation areas in other neighborhoods. In addition, many of these people cannot enjoy existing facilities and programs because they lack the price of admission and, in some cases, the special equipment required for participation.

(1) Urban Land Needs

The predominantly urban nature of this area is reflected in the needs for developed land to accommodate activities usually associated with urban areas. Developed acreage needs exceeded 13,000 acres in 1970. By 2020 this figure will grow to nearly 67,000 acres. The greatest developed-acreage needs are for golf courses and playfields, both in 1970 and through 2020 (Figure 21–74).

(2) Nonurban Land Needs

Developed nonurban land needs were 4,700 acres in 1970, increasing to nearly 23,000 acres in 2020. Nearly 1,100 developed acres were needed for picnicking in 1970. By 2020 nearly 4,500 acres will be required to meet the picnicking requirements. The need for additional campsites will grow from 1,070 acres in 1970 to more than 5,800 acres by the year 2020.

(3) Total Land Needed for Recreation

Land acreage needs stated above are for developed facilities and do not include estimates for additional land for buffers between varying land uses. The total land needed for outdoor recreation (including developed and undeveloped land) in this planning subarea was 36,000 acres in 1970, and will increase to 194,000 acres by 2020. Table 21–32 portrays the recreational requirements, supply, and needs by activity for Planning Subarea 4.1 for each of the target years.

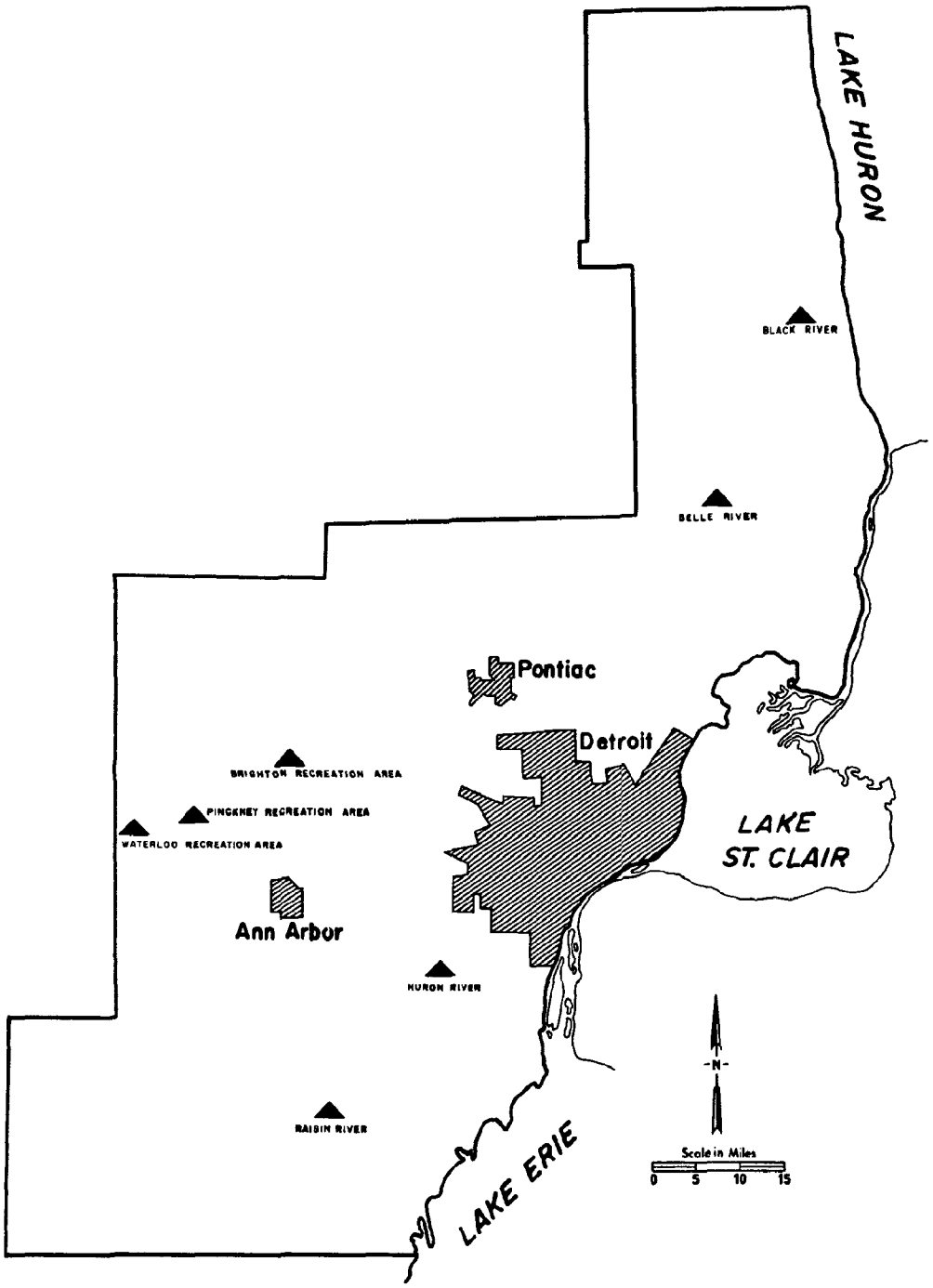


FIGURE 21–73 Reference Map for Planning Subarea 4.1. Inadequate information prohibited the location of all areas identified in text.

(4) Water Needs

According to the methodology used in the appendix, no water surface acreage needs existed in 1970. Estimates put such needs at 55,000 acres by 1980. Needs for water surface acreage for boating activities (including water-skiing) are expected to increase to 454,000 acres by 2020.

4.6.9.2 Problems

Many problems were presented in Subsection 4.5. Other problems specific to Planning Subarea 4.1 include the following:

(1) There was an average of only 15.0 acres of all types of recreation land available per 1,000 people in this planning subarea in 1964.[57] Residents of Wayne County (Detroit) had only 5.0 acres of recreation lands per 1,000 people. This relationship has changed very little since that time. The National Recreation and Park Association[59] recommends an average of 10 acres of urban recreation areas, 15 acres of extra urban open space, and 65 acres of large parks, forests, and other open space per 1,000 people. It seems unlikely that this standard can be met here.

(2) Because segments of many flood plains have been developed for residential, commercial, or industrial uses, substantial portions of the limited resources of the Detroit area are not available for recreational development.

(3) Much of the shoreline along western Lake Erie is quite flat and marshy, and areas that are not marshy have been developed for industrial and residential uses. Thus, the potential for recreational development along this segment of the Lake Erie shoreline is limited.

(4) The use of several beaches on Lake Erie between Detroit and Toledo, including Sterling State Park, has been greatly limited by pollution.

4.6.9.3 Suggestions for Future Action

While there will continue to be a need for highly trained recreation specialists, there is an even greater need for recreation supervisors who can identify with the neighborhoods. Most recruitment should be local, and levels of training should be appropriate to the activities an individual will supervise.

Private holdings within existing State recreational areas—Waterloo, Pinckney, and Brighton—should be acquired. This would improve development and management efficiency in such areas. It is estimated that an additional 4,000 acres of developed land could ultimately be obtained in these recreation areas, if they were blocked in and developed to their optimal potential. Other State and metropolitan park areas should be enlarged where suitable land is available and where such expansion can be used effectively.

Courtesy of Michigan Tourist Council

Courtesy of U.S. Soil Conservation Service

FIGURE 21–74 A Diversity of Activities. Recreational opportunities are diversified near Detroit, Michigan.

Other areas that should be considered for recreational use include the valleys of the Raisin, Huron, Belle, and Black Rivers and their tributaries. Valleys of other smaller streams should be considered for recreational development where they are of adequate size and quality.

The Bureau of Outdoor Recreation, with the cooperation and assistance of other Federal, State, and local agencies, is presently evaluating the Lake Erie shoreline of this planning subarea for possible development as a large national urban recreation area. The original study included the mouth of the Huron River, the Stony Point area, the Sterling State Park-Raisin River mouth area, and the Ottawa River mouth area near Toledo, and may be extended to include the entire shoreline from Port Huron, Michigan, to Port Clinton, Ohio.

The land and water resources of the morainic area extending from western and northern Washtenaw County through southern Livingston and Oakland Counties have substantial potential for recreational development where urban development has not preempted their use. Suitable areas should be acquired and developed as soon as possible.

Based on data from the IJC study of the Great Lakes beaches,[16] there are approximately eleven miles, or 100 acres, of beach along the southern end of Lake Huron in Sanilac and St. Clair Counties that have potential for acquisition and recreational development. Some of them are impaired to some degree by dirty sand. In addition, a number of privately owned beaches along the Lake St. Clair shores have significant potential for intensive recreational development and use, although mercury and other pollutants present health dangers.

A park with a reservoir is proposed for development on Mill Creek, a tributary of the Huron River in Washtenaw County, by the Huron-Clinton Metropolitan Authority. This facility would be located south of Interstate Route 94, ten miles west of Ann Arbor, and 50 miles west of Detroit. Two alternatives are being considered; one would include 4,900 acres of land with a 650-acre impoundment. The other would consist of 3,500 acres of land with a 550-acre impoundment. Each of these facilities would provide a full range of recreational activities.

Another reservoir site, on the Tiffin River just above Morenci, has been proposed to control flooding along the Tiffin River in Ohio. This site, if developed, has some recreational potential. If any reservoirs are built under P.L. 566 by the Soil Conservation Service, their recreational potential should be developed to their optimal level. Other reservoir sites should also be examined for their recreational potential.

Two possibilities noted for Planning Subarea 2.3, the Sandstone and Doan Creek reservoirs, could provide a substantial amount of recreational opportunities for people in Planning Subarea 4.1.

Estuarine areas along Lakes Erie and St. Clair should be preserved and managed for their beneficial effects on wildlife. Their rec-

Courtesy of Michigan Department of Natural Resources

FIGURE 21–75 Imagination. An empty city lot can be turned into a rewarding urban recreation experience.

reational potential should be developed only as far as it is compatible with fish and wildlife management.

The Michigan Outdoor Recreation Plan of March 1, 1967,[21] lists an additional State park programmed for Sanilac County. Campground developments are planned for this park.

Additional recreational opportunities could be provided through development of adequate public access sites on those lakes and streams which presently do not have suitable access. Such access would be especially beneficial for boating and fishing.

Redevelopment and rehabilitation of lands and facilities will be necessary if inner-city needs are to be satisfied (Figure 21–75). Some of the recreational needs of Detroit can be met through improvement and construction of neighborhood multi-purpose community centers, tot-lots, parks, and playgrounds. Such facilities, especially community centers, should be operated in conjunction with the public schools, and school facilities made available for general recreational and cultural activities. In addition, consideration should be given to the recreational use of rooftops and to the passive use of cemeteries.

A large part of overnight and weekend activity has been exported from this planning subarea to the eastern shore of Lake Michigan, to the upper part of Michigan's Lower Peninsula, and to Michigan's Upper Peninsula. This trend will continue and may intensify as the Detroit area becomes more heavily populated. These people will seek recreation largely in Planning Subareas 1.2, 2.4, and 3.1.

Because of the large volume of recreation needs, a more detailed study of the recreation potentials and problems of this planning subarea is needed. The comprehensive water-related project study for Southeast Michigan, presently under way, could aid in accomplishing this task.

4.6.9.4 Plan Design

Existing public lands, currently underdeveloped, should be developed more intensively for Class I areas. New lands should be acquired and developed to satisfy many of the urban needs. For Class II type recreational areas, two alternatives should be utilized to provide the needed facilities. All existing publicly owned lands, largely State and regional parks and forests, should be developed to their optimal capacity. Some of these lands can accommodate facilities for recreational activities not now provided for.

New lands will have to be acquired to satisfy much of the recreational need. The following elements are proposed for recreational development. They have been placed in a general priority system, although priorities for most can be changed either higher or lower without serious consequences.

These areas should be considered for acquisition, 1970–1980:

(1) private holdings within existing recreation areas—700 acres of developed land

(2) forty miles of stream valleys along the Huron, the northern branch of the Clinton, Raisin, and Belle Rivers and their tributaries—6,400 acres

(3) initiation of the proposed large recreation complex on the Lake Erie shore between Detroit and Toledo—5,000 acres

(4) Lake Huron beaches in St. Clair and Sanilac Counties—five miles, 1,600 acres

(5) two new regional parks—2,000 acres each

The following elements should be given priority for acquisition and development during the 1980–2000 time period:

(1) additional private holdings within existing recreation areas—1,200 acres of developed land

(2) an additional area of 50 miles of stream valley along the Huron, Raisin, north branch of the Clinton, Belle, and Black Rivers, and their tributaries—8,000 acres

(3) continued development of the Lake Erie recreation area between Detroit and Toledo—5,000 acres

(4) more new regional parks—two of 2,000 acres each

The following elements should be given priority for acquisition and development during the 2000–2020 time frame:

(1) additional private holdings within existing areas—1,900 acres of developed land

(2) an additional area of 50 miles of stream along the Raisin, Huron, Belle, and Black Rivers and their tributaries—8,000 acres

These miscellaneous items should be given priority during the entire period:

(1) provision of additional access sites in suitable places on Lakes Erie and St. Clair and their tributary streams

(2) reclamation of polluted beach areas along the Lake Erie shore in and near the Detroit and Toledo areas

(3) acquisition of land and development of small impoundments and recreation facilities under Public Law 566

TABLE 21–32 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 4.1

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	390	260	130	580	260	320	930	260	670	1,350	260	1,090
Picnicking	2,280	1,160	1,120	2,910	1,160	1,750	4,060	1,160	2,900	5,630	1,160	4,470
Camping	1,450	380	1,070	2,340	380	1,960	3,600	380	3,220	6,200	380	5,820
Parking (General)	820	350	470	1,160	350	810	1,750	350	1,400	2,490	350	2,140
Parking (Boats & Water-Skiing)	640	260	380	980	260	720	1,580	260	1,320	2,450	260	2,190
Subtotal	5,580	2,410	3,170	7,970	2,410	5,560	11,920	2,410	9,510	18,120	2,410	15,710
Acres of Developed Land for Other Summer Activities												
Playfields	7,230	3,940	3,290	10,900	3,940	6,960	18,800	3,940	14,860	28,530	3,940	24,590
Golf	11,780	2,200	9,580	17,660	2,200	15,460	30,500	2,200	28,300	44,680	2,200	42,480
Subtotal	19,010	6,140	12,870	28,560	6,140	22,420	49,300	6,140	43,160	73,210	6,140	67,070
Acres of Developed Land for Winter Activities												
Snow Skiing	1,040	230	810	1,140	230	910	1,460	230	1,230	1,870	230	1,640
Sledding	1,260	0	1,260	1,650	0	1,650	2,680	0	2,680	4,250	0	4,250
Ice Skating	100	50	50	160	50	110	260	50	210	410	50	360
Subtotal	2,400	280	2,120	2,950	280	2,670	4,400	280	4,120	6,530	280	6,250
Total Acres of Developed Land	26,990	8,830	18,160	39,480	8,830	30,650	65,620	8,830	56,790	97,860	8,830	89,030
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	157,000	191,000	0	246,000	191,000	55,000	407,000	191,000	216,000	645,000	191,000	454,000
Miles of Trails												
Hiking & Nature Walks	590	110	480	950	110	840	1,480	110	1,370	2,190	110	2,080
Bicycling	1,160	130	1,030	1,420	130	1,290	1,960	130	1,830	2,550	130	2,420
Horseback Riding	280	50	230	360	50	310	530	50	480	780	50	730
Total Miles of Trail	2,030	290	1,740	2,730	290	2,440	3,970	290	3,680	5,520	290	5,230
Total Needs for New Lands for Recreation (Acres)												
Class I			16,000			28,400			64,800			85,800
Class II			20,300			33,100			55,800			108,600
Total Land Needs			36,300			61,500			120,600			194,400
Total Needs for New Lands for Water-Oriented Recreations (Acres)												
Total Water-Oriented Land Needs			14,500			23,700			30,100			78,100
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	85,398			117,492			180,873			263,893		
For water-oriented recreation activities (1000s)	21,371			31,444			48,346			71,433		

4.6.10 Planning Subarea 4.2

Planning Subarea 4.2 (Figure 21–76) is located in northwest Ohio and northeast Indiana. It includes a 23-county area lying at the western end of Lake Erie and is drained mostly by the Maumee, Portage, Sandusky, Huron, and Vermilion Rivers. Most of the 1.7 million people residing in this area live in the three SMSAs, Toledo, Lima, and Fort Wayne.

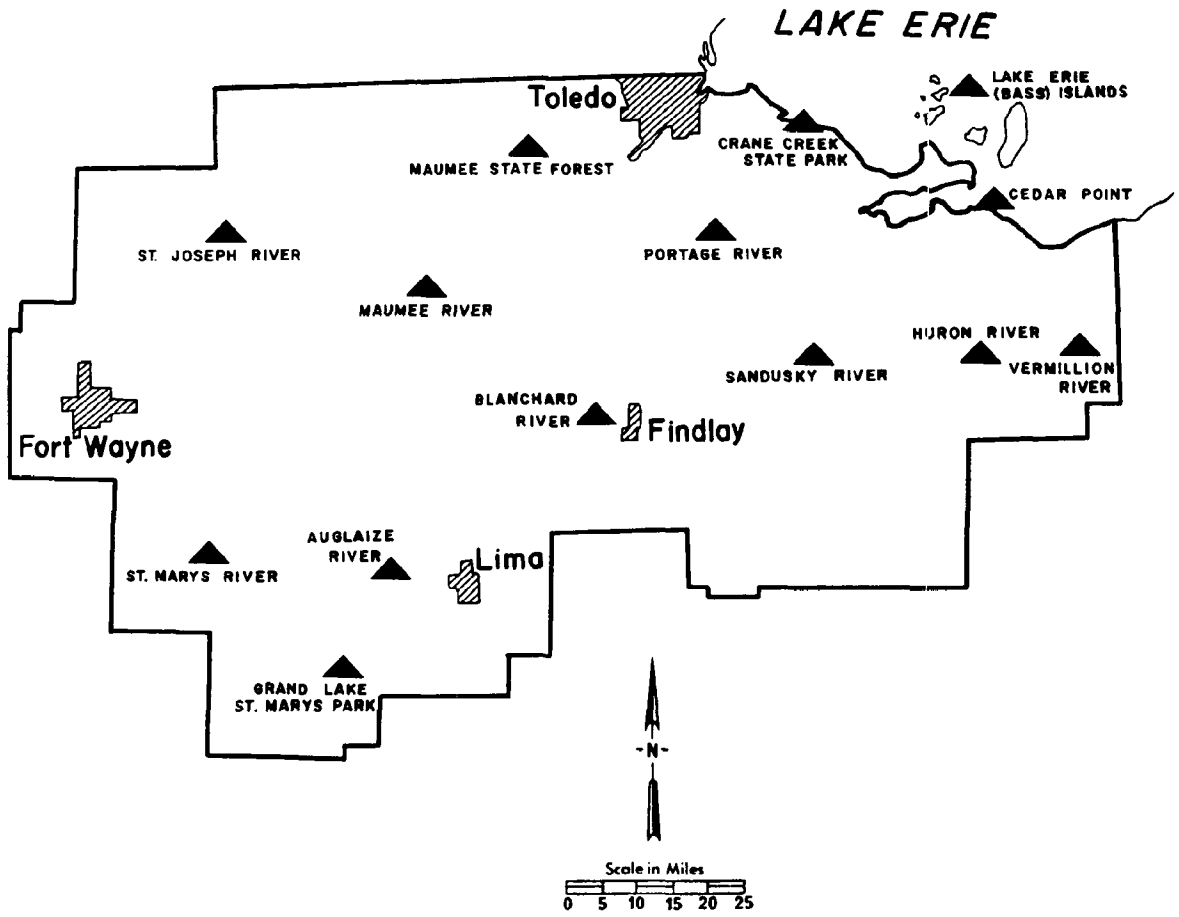


FIGURE 21-76 Reference Map for Planning Subarea 4.2. Inadequate information prohibited the location of all areas identified in text of report.

The land is used chiefly for agricultural production so resources with recreational potential are limited. Although nearly 89 miles of Lake Erie shoreline are included, much of it is marshy. The uplands consist largely of flat lake plains with weakly incised streams. The few significant areas with major recreation potential are located along the larger streams. The Maumee River has been designated for possible inclusion in the National or State Wild and Scenic Rivers Systems.

Gross land area available for recreation is almost 24,000 acres, much of which is in State and local parks and forests. Great Lakes water surface for recreation amounts to 59,000 acres and inland lakes to 26,000 acres.

Total recreational requirement for 1970 totaled 46 million recreation days and is expected to increase to more than 141 million by 2020. Water-oriented recreation requirement exceeded 12 million recreation days in 1970 and is projected to increase to nearly 39 million by 2020.

4.6.10.1 Estimate of Needs

Although this planning subarea generates a large demand for recreational facilities, they are available only on a limited basis. Until such time as substantially increased opportunities are provided, many residents of this planning subarea will continue to satisfy their recreational needs outside of the area.

(1) Urban Land Needs

Nearly three-fourths of the total recreational needs for developed land are oriented toward urban areas. This reflects the impact of recreational needs from such cities as Toledo, Fort Wayne, Lima, Findlay, Fremont, and Sandusky.

The greatest single need for developed-

facility acreage is for playfields; needs for picnicking, swimming, and trails are also large.

The total amount of Class I recreational land which should be acquired and developed to meet urban recreational needs was approximately 320 acres in 1970 and will grow to nearly 25,000 acres by 2020.

(2) Nonurban Land Needs

Although nonurban needs in this planning subarea are substantial, a significant number of people travel northward into Michigan from this area for weekend and vacation use. Data are not available to measure the magnitude of this export of recreational activity. There is, however, need for development of additional land in this area for a wide variety of recreational opportunities, especially for those who cannot or will not travel great distances.

Need for all Class II recreation lands was estimated to be 12,200 acres in 1970, and is projected to increase to nearly 90,000 acres in 2020.

(3) Total Land Needs for Recreation

Assuming no exportation of recreational needs, the total amount of land necessary to meet recreational needs in this planning subarea is expected to increase from 12,250 acres in 1970 to more than 114,000 acres by 2020. Nearly all of this land will need to be acquired and developed. It must be stressed, however, that since an unknown quantity of needs are exported to the north, this projection will be somewhat high. Table 21–33 shows recreational requirement, supply, and needs by activity for Planning Subarea 4.2 for each of the target years.

(4) Water Needs

Water surface is very limited in this area because there are no large lakes or reservoirs except for Lake Erie. The need for surface water is projected to increase from a surplus in 1970 to 263,000 acres by 2020, assuming that all desires for boating and water-skiing are to be met. It seems most unlikely that such a large gap can be closed.

The surface waters of Lake Erie provide a large potential supply of water surface for those activities, but this use is presently limited by inadequate access, adverse weather conditions, and pollution. Only 50 percent of the surface area within two miles of the shoreline is presently included in existing supply.

4.6.10.2 Problems

The recreational objectives related to Planning Subarea 4.2 will not be easily attained. Several problems other than those discussed in Subsection 4.5 of this appendix need to be stressed.

While Lake Erie provides vast areas of water surface, climatic conditions frequently preclude use of these waters by small boat operators. The Lake is subject to frequent roughness especially around the Lake Erie Islands, and can quickly become hazardous for small boats, so the lack of adequate harbors of refuge greatly restricts utility.

Even though the Maumee State Forest, containing more than 3,000 acres, lies just west of the Toledo metropolitan area, it offers only limited opportunity for recreational activities because of the very fragile nature of the environment. The Oak Openings Park of 3,200 acres has similar limitations to intensive development.

The amount of land potentially usable for recreation in this planning subarea is very limited. Much of the area is characterized by the flat, almost featureless lake plain area of northwest Ohio. The only lands having significant recreational potential lie in and along stream valleys which, for the most part, are only slightly incised into the upland areas.

4.6.10.3 Suggestions for Future Action

Although this planning subarea is rather limited in the resource base needed to develop quality recreational facilities, there are a number of areas scattered throughout the planning subarea that can supply, if properly developed, a significant amount of recreational opportunity. While the Toledo area has a number of large city, regional, and State parks, the Lima and Fort Wayne areas are especially in need of public recreation lands.

Redevelopment and rehabilitation of land and facilities will be necessary if inner-city needs are to be satisfied. Some urban needs can be met through the improvement and construction of neighborhood multi-purpose community centers, tot-lots, parks, and playgrounds. Such facilities, especially community centers, should be operated in conjunction with the public schools. School facilities should be made available for general recreational and cultural activities to the fullest possible extent.

Potential major reservoir sites in this planning subarea are limited. Potential sites are located on the Sandusky, St. Joseph, St. Marys and Auglaize Rivers and their tributaries. The Northwest Ohio Water Development

Plan[39] lists several planned reservoirs that offer excellent potential for the development of certain types of recreational facilities.

There are numerous smaller reservoir sites that could be developed within the scope of Public Law 566 through the Soil Conservation Service and local activity. These sites could satisfy substantial recreational needs at a local level. Whenever reservoirs are constructed, their recreational potential should be developed to the fullest extent.

The Maumee, Sandusky, and Huron Rivers and their adjacent flood plains have significant potential for recreational development. The degree of development should be influenced by both the estimated needs of the area and the constraints imposed by relevant State or Federal scenic rivers legislation.

The Lake Erie shoreline provides only limited potential for extensive development of additional recreational facilities. Chaska Beach and the undeveloped portions of Cedar Point appear to be the only shore areas with substantial potential for extensive recreational development within the Planning Subarea 4.2 portion of Lake Erie.

The Lake Erie Islands make up an area with substantial potential for recreational development. With greater development, these islands could provide opportunities for a broad range of recreational activities. However, opportunities for certain types of development such as swimming beaches would be limited (Figure 21–77).

There are more than 17,000 acres of State and Federal wildlife lands in this planning subarea. These areas can support limited recreational development, especially camping, picnicking, and trails. If one percent of these areas were developed for intensive use, it would add 170 acres of recreational lands.

A portion of the North Country Trail is proposed to traverse this area. If established, it would provide hiking and walking enthusiasts with a trail through an intensively cropped agricultural area.

Other recreational opportunities can be provided by acquisition and development of access sites on streams and Lake Erie where present development is inadequate. Additional harbors of refuge and marinas should be considered for the Lake Erie shore.

The private sector, already providing substantial amounts of recreational opportunity, especially for camping, boat launching, and golfing, could provide additional opportunities in these and other activities.

Due to the tremendous demand and the limited opportunities to develop recreational facilities, a more detailed study of the recreation problems and potentials of this planning subarea should be undertaken. The proposed Maumee River Basin Level B Study could accomplish this task.

Courtesy of Ohio Division of Parks and Recreation

FIGURE 21–77 Lake Erie Islands. Beach Scene at Kelleys Island State Park, Ohio.

TABLE 21–33 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 4.2

Activity	1970			1980			2000			2020		
	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	210	90	120	320	90	230	500	90	410	730	90	640
Picnicking	1,240	870	370	1,580	870	710	2,150	870	1,280	3,050	870	2,180
Camping	780	480	300	1,250	480	770	2,040	480	1,560	3,290	480	2,810
Parking (General)	450	220	230	630	220	410	950	220	730	1,390	220	1,170
Parking (Boats & Water-Skiing)	370	40	330	540	40	500	910	40	870	1,420	40	1,380
Subtotal	3,050	1,700	1,350	4,320	1,700	2,620	6,550	1,700	4,850	9,880	1,700	8,180
Acres of Developed Land for Other Summer Activities												
Playfields	3,820	3,730	90	5,690	3,730	1,960	9,870	3,730	6,140	14,950	3,730	11,220
Golf	6,420	10,440	0	8,380	12,620	0	15,340	12,620	2,720	23,560	12,620	10,940
Subtotal	10,240	14,170	90	14,070	16,350	1,960	25,210	16,350	8,860	38,510	16,350	22,160
Acres of Developed Land for Winter Activities												
Snow Skiing	560	0	560	610	0	610	790	0	790	1,010	0	1,010
Sledding	690	0	690	890	0	890	1,470	0	1,470	2,270	0	2,270
Ice Skating	60	170	0	80	170	0	150	170	0	230	170	60
Subtotal	1,310	170	1,250	1,580	170	1,500	2,410	170	2,260	3,510	170	3,340
Total Acres of Developed Land	14,600	16,040	2,690	19,970	18,220	6,080	34,170	18,220	15,970	51,900	18,220	33,680
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	84,000	85,000	0	131,000	85,000	46,000	218,000	85,000	133,000	348,000	85,000	263,000
Miles of Trails												
Hiking & Nature Walks	320	120	200	500	120	380	820	120	700	1,190	120	1,070
Bicycling	620	0	620	760	0	760	1,050	0	1,050	1,450	0	1,450
Horseback Riding	150	30	120	180	30	150	280	30	250	420	30	390
Total Miles of Trail	1,090	150	940	1,440	150	1,290	2,150	150	2,000	3,060	150	2,910
Total Needs for New Lands for Recreation (Acres)												
Class I			320			2,600			10,600			24,900
Class II			12,200			25,900			52,700			89,200
Total Land Needs			12,520			28,500			63,300			114,100
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			8,900			17,500			32,100			54,100
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	45,943			62,927			97,031			141,499		
For water-oriented recreation activities (1000s)	12,019			16,947			26,127			38,699		

4.6.10.4 Plan Design

For much of the Class I type recreational development, new lands will have to be acquired in and near urban areas throughout the planning subarea. Some urban needs could be satisfied through intensive development of small nodes within metropolitan parks where they lie in densely populated areas.

To increase Class II type recreational areas, all existing underdeveloped publicly owned land should be developed to optimal capacity while maintaining as natural a setting as possible.

New lands will have to be acquired to satisfy much of the recreational need. Several elements are proposed for recreational development. Some of these, especially those involving land acquisition, are critical in meeting future needs and must be acted upon in the near future.

Construction of the storage reservoirs planned in the Northwest Ohio Water Development Plan[39] and associated recreation facilities should be continued as scheduled. Crane Creek State Park, Grand Lake St. Marys State Park, and Oak Openings Park should be developed to optimal levels.

In addition to the above, the following elements should be given priority for acquisition and development during 1970–1980:

(1) segments of the Maumee, Auglaize, and Sandusky River valleys

(2) Bucyrus Reservoir, pending authorization for construction

(3) a new State park on the Maumee River near Fort Wayne

(4) portions of the Lake Erie Islands

These should be given acquisition and development priority during the 1980–2000 time period:

(1) segments of the Blanchard, St. Joseph, Huron, Defiance, and Portage River valleys

(2) segments of the Maumee, Auglaize, and Sandusky River valleys

(3) portions of the Lake Erie Islands

(4) the Powell Creek Recreation area

The following elements should be considered for acquisition and development, 2000–2020:

(1) segments of the Maumee, Sandusky, Portage, St. Joseph, Blanchard, Defiance, and Huron River valleys

(2) segments of the Vermilion and St. Marys River valleys

(3) two new 2,000-acre State parks oriented to major water surface areas, if possible

Miscellaneous to be given consideration during the entire period include:

(1) the provision of additional boat access sites in suitable places on Lake Erie and its tributary streams

(2) the acquisition and development of land for recreational use on all suitable P.L. 566 impoundments

4.6.11 Planning Subarea 4.3

This planning subarea is located in the gently rolling terrain of the Lake Erie region. It encompasses an 8-county area of northeastern Ohio and is characterized by a high degree of urbanization and industrialization. Approximately 80 percent of the total effective population is derived from urban areas. Cleveland, largest city in the planning subarea, is third largest in the entire Region. The residents of Cleveland, Akron, and other cities exert great recreational demands within the area (Figure 21–78).

The area includes the Black, Rocky, Cuyahoga, Chagrin, and Grand Rivers, all of which possess significant recreational potential, and lies along the southern Lake Erie shoreline. Gross land available for recreation is approximately 33,700 acres, mostly located in State, county, and local parks. Inland water surface areas total 15,000 acres, while Lake Erie adds another 69,000 acres for recreation.

The total annual recreational requirement in 1970 was 58,821,000 recreation days. This requirement is expected to reach 168,154,000 recreation days by 2020. The water-oriented requirement in 1970 was 15,228,000 recreation days, and is projected to be 45,565,000 recreation days by 2020.

4.6.11.1 Estimate of Needs

Within Planning Subarea 4.3 there is an ever-increasing pressure on recreational facilities because of a growing population that is experiencing rising incomes, greater mobility, and more leisure time. This pressure is being felt especially on day-use type recreational facilities.

(1) Urban Needs

The predominantly urban nature of this area is reflected in its need for developed land to accommodate urban-type activities. The more than 2,200 developed acres in 1970 are expected to reach 30,500 acres by 2020. Needs for playfields are expected to increase from

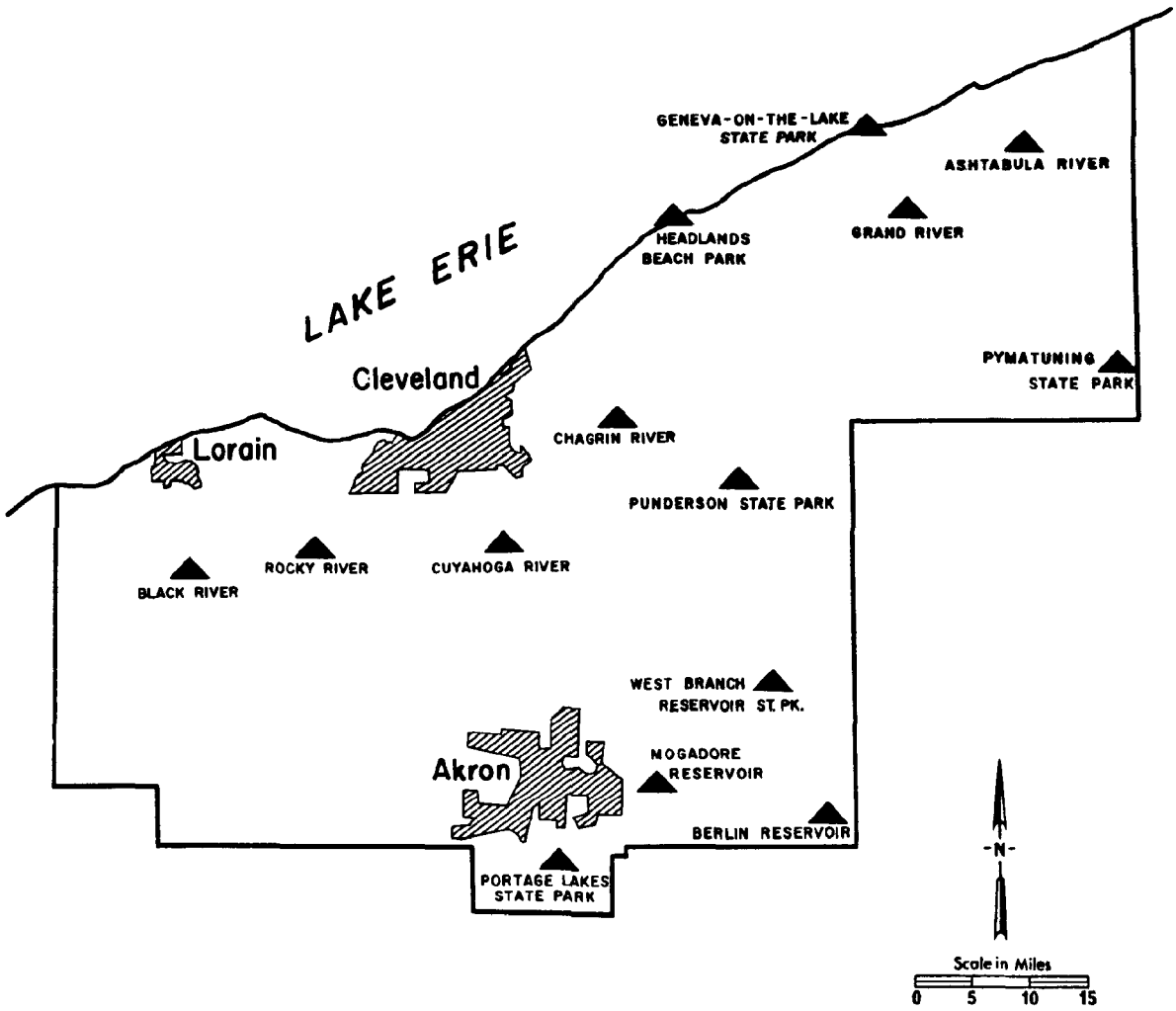


FIGURE 21–78 Reference Map for Planning Subarea 4.3. Inadequate information prohibited the location of all areas identified in text.

1,000 acres in 1970 to more than 14,000 acres in 2020. Golf course needs will also increase rapidly during this period. Other activities to be accommodated include picnicking and swimming. Total need for Class I recreational lands is projected to increase from 2,100 acres in 1970 to more than 34,000 acres in 2020.

(2) Nonurban Needs

Developed nonurban land needs, 9,100 acres in 1970, is projected to top 90,000 acres in 2020. Nearly 700 developed acres were needed for picnicking in 1970. This will increase to nearly 2,700 acres by 2020. The need for additional camping sites will grow from a near-balance in 1970 to approximately 2,700 acres by 2020. Additional land acreage is needed for winter sports, trails, and parking. Total needs for Class II recreation lands are estimated to increase from 8,900 acres in 1970 to 95,000 acres in 2020.

(3) Total Land Needed for Recreation

The total land, both developed and undeveloped, needed for outdoor recreation in this planning subarea approached 11,000 acres in 1970, and is expected to increase to approximately 110,000 acres by 2020. Table 21–34 portrays the recreational requirement, supply, and needs by activity for Planning Subarea 4.3 for each of the target years.

(4) Water Needs

The water surface acreage needs for all boating activities are expected to increase from 23,000 acres in 1970 to approximately 326,000 acres in 2020.

4.6.11.2 Problems

Most problems associated with recreation within Planning Subarea 4.3 have previously been stressed in Subsection 4.5 of this appendix and will, therefore, not be repeated here. Two other problems specifically relevant to this planning subarea are discussed below.

Facilities provided by the State of Ohio will help to alleviate only a part of the estimated recreational needs. Because of the limited amount of water surface area, plus water-related construction limitations, the supply of water available for boaters and water-skiers will continue to decrease on a per-capita basis. According to Appendix R9, *Recreational Boating*, there were 47,186 registered boats in this 8-county area of Ohio in 1968, creating a tremendous demand on the facilities and water surface. Boat registrations in Ohio have been increasing at an average annual rate of 6.5 percent. It is anticipated that the rate of increase in the planning subarea will at least equal that of the State. It is apparent that the demand for facilities for such water-based activities will not be adequately met in the near future. On the other hand, needs for swimming can be met on relatively small areas of water surface.

Lake Erie has vast expanses of water surface that are potentially available to meet a part of the need for powerboating and waterskiing. At the present time, activities are restricted significantly by limited launching and docking facilities, rough water, and limited public ownership of lake frontage. The use of several public beaches in the Cleveland area has been greatly limited by pollution.

This area contains several large cities, so the provision of urban recreational opportunities is of paramount importance. Exclusive of Cleveland Metropolitan Park District land and municipal golf courses, there are only approximately 3.5 acres of recreational land per 1,000 residents in the City of Cleveland. Akron provides only 2.7 acres per 1,000 people. Present standards indicate a need of 6 to 10 acres of land for neighborhood, community, and district parks.

4.6.11.3 Suggestions for Future Action

A significant supply exists in the planning subarea, consisting of flood plains, existing and potential beaches and parks, and existing and potential reservoirs. Development of such areas could eventually provide recreational opportunities at strategic locations for large numbers of people.

The State of Ohio has completed a study on the recreational potential of the lower Cuyahoga valley.[38] It has recommended that within certain limits, all lands in the valley not now publicly owned be acquired; acquisition of scenic rights to all lands on the sloping sides of the valley; development of certain types of recreational facilities; and the rehabilitation and maintenance of the Cuyahoga River and its tributaries. This plan proposes to preserve most of the scenic qualities and historic features of the valley and to provide a range of recreational opportunities in keeping with its character.

The State of Ohio is developing new beach area on Lake Erie at Geneva-on-the-Lake in Ashtabula County and at Headlands in Lake County. It has recently expanded, or plans to expand, facility development in larger parks. The expansion program includes additional facilities for Pymatuning, Punderson, West Branch Reservoir, and Portage Lakes State Parks. Ohio has also indicated an intent to develop a State park and wildlife area on Tinkers Creek, a tributary of the Cuyahoga River. Approximately 600 acres of land have already been acquired.

Several areas of beach along Lake Erie east of Cleveland have substantial development potential. Two of the more prominent are the Lakeshore Beach Park area in Lake County and the Lake Erie beach east of Conneaut in Ashtabula County. Other smaller areas could be developed for local use.

Publicly owned wildlife areas offer some additional potential for recreational development. Where they are suitable, as much as one or two percent of these lands could be developed for picnicking and primitive camping. Related activities such as hiking, nature walks, birdwatching, and wildlife photography would be readily available.

A number of metropolitan park systems have been organized in this area. Together with county and municipal governmental units, they have developed many acres of parks with recreational facilities. The Cleveland and Akron Metropolitan Park systems are quite extensive, containing 15,000 and 5,000 acres, respectively. Except for those on Lake Erie, these parks have limited water surface areas, and are used chiefly for picnicking, nature walks, hiking, and similar activities. While many of the metropolitan parks have extensive acreages, they have limited amounts of developed land in relation to their total acre-

ages. For example, the Cleveland Metropolitan Park District provides 19 acres of undeveloped land for each acre of developed land. While these areas provide very substantial opportunities for certain types of activities, they provide only limited recreational facilities in relation to their total acreage. Such areas are usually located in rugged, scenic valleys where planning has stressed the preservation of aesthetic qualities.

Redevelopment and rehabilitation of land and facilities will be necessary if inner-city needs are to be satisfied. Some urban needs can be met through the improvement and construction of neighborhood multi-purpose community centers, tot-lots, parks, and playgrounds. Such facilities, especially community centers, should be operated in conjunction with the public schools. School facilities should be made available for general recreational and cultural activities to the fullest possible extent.

Ohio has accelerated the development of park facilities in an attempt to meet the ever-increasing demand for quality outdoor recreation experiences. The State has passed substantial bond issues to provide funds for such developmental programs.

Metropolitan park districts, counties, and municipalities have also increased their developmental programs, but they have limited resources. It seems unlikely that any county or group of counties, with all of their other obligations, can undertake sufficient development of major park facilities, including water surface, to provide a full complement of water-dependent and land-based facilities to meet a major part of the total needs. However, the Cleveland, Summit, and Lake County Metropolitan Park Districts have already acquired extensive areas of recreational lands, chiefly along the more rugged stream valleys in their respective areas. With assistance from State and Federal levels these agencies are in an excellent position to continue their expansion program.

In the lower Cuyahoga valley below Akron, it appears that any development of water impoundments would be restricted to tributary streams by the high cost of highway and railroad relocation in the main valley. Several sites are available on Tinkers Creek, a tributary extending east from the main valley.

In the upper part of the Cuyahoga River basin, there are a number of sites that could be developed for water supply and other uses. The Ohio Division of Water has identified several sites with significant reservoir potential, although development of these sites for water supply gives no assurance that recreation would be included. Numerous smaller sites in most of these basins also could be developed for recreation and fish and wildlife purposes.

The Corps of Engineers has studied several sites in the lower part of the Chagrin valley and found that they are either too costly for development or that development would cause undesirable modification of unique resources which should be preserved. However, several sizable sites in the upper part of the valley appear to have potential for development. If sites are to be developed in this valley, action will need to be taken relatively soon to acquire land before urbanization precludes recreational development.

A large site with potential for 4,500 acres of water could be developed on the Ashtabula River, but such a site would probably have to be developed chiefly for recreational use since other potentials are very limited.

There are several potential reservoir sites on the Rocky and Black Rivers. These would range from small to medium in size. The best potential sites in this planning subarea are two alternative sites on the Grand River in Ashtabula and Trumbull Counties. The Harpersfield and Grand River sites, which would contain 64,900 and 40,500 acres, respectively, were being studied by the Corps of Engineers, State of Ohio, Bureau of Outdoor Recreation, Bureau of Sport Fisheries and Wildlife, and the Environmental Protection Agency. Either of these sites could provide a tremendous amount of recreational opportunities.

Numerous smaller sites could be developed within the scope of Public Law 566 through the Soil Conservation Service and local people. These could provide substantial quantities of recreational opportunities for local needs.

Several existing reservoirs in this planning subarea have substantial potential for recreational development. Among them are Berlin, Mogadore, West Branch, Ladue, and Rockwell Reservoirs.

Due to the tremendous requirement for recreation, a Level B study should be conducted in this planning subarea to evaluate recreation problems, potentials, and solutions. At this time, it seems reasonable to assume that some people will continue to seek recreational opportunities outside of the region.

4.6.11.4 Plan Design

For much Class I type recreational de-

TABLE 21-34 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 4.3

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	270	200	70	390	200	190	600	200	400	860	200	660
Picnicking	1,580	900	680	1,950	900	1,050	2,640	900	1,740	3,590	900	2,690
Camping	1,000	1,240	0	1,560	1,240	320	2,510	1,240	1,270	3,930	1,240	2,690
Parking (General)	570	480	90	780	480	300	1,140	480	660	1,610	480	1,130
Parking (Boats & Water-Skiing)	440	70	370	650	70	580	1,020	70	950	1,560	70	1,490
Subtotal	3,860	2,890	1,210	5,330	2,890	2,440	7,910	2,890	5,020	11,550	2,890	8,660
Acres of Developed Land for Other Summer Activities												
Playfields	5,000	4,000	1,000	7,320	4,000	3,320	12,260	4,000	8,260	18,230	4,000	14,230
Golf	8,160	18,600	0	11,820	18,600	0	20,000	18,600	1,400	29,340	18,600	10,740
Subtotal	13,160	22,600	1,000	19,140	22,600	3,320	32,260	22,600	9,660	47,570	22,600	24,970
Acres of Developed Land for Winter Activities												
Snow Skiing	720	60	660	760	60	700	940	60	880	1,180	60	1,120
Sledding	870	0	870	1,100	0	1,100	1,740	0	1,740	2,720	0	2,720
Ice Skating	70	100	0	110	100	10	170	100	70	260	100	160
Subtotal	1,660	160	1,530	1,970	160	1,810	2,850	160	2,690	4,160	160	4,000
Total Acres of Developed Land	18,680	25,650	3,740	26,440	25,650	7,570	43,020	25,650	17,370	63,280	25,650	37,630
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	107,000	84,000	23,000	164,000	84,000	80,000	264,000	84,000	180,000	410,000	84,000	326,000
Miles of Trails												
Hiking & Nature Walks	410	50	360	640	50	590	960	50	910	1,390	50	1,340
Bicycling	800	0	800	940	0	940	1,270	0	1,270	1,720	0	1,720
Horseback Riding	190	80	110	240	80	160	340	80	260	490	80	410
Total Miles of Trail	1,400	130	1,270	1,820	130	1,690	2,570	130	2,440	3,600	130	3,470
Total Needs for New Lands for Recreation (Acres)												
Class I			2,100			5,900			15,100			34,200
Class II			8,900			16,800			41,900			95,300
Total Land Needs			11,000			22,700			57,000			129,500
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			8,100			16,300			33,500			57,700
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	58,821			78,816			117,554			168,154		
For water-oriented recreation activities (1000s)	15,228			21,084			31,420			45,565		

velopment, new lands will have to be acquired in and near urban areas throughout the planning subarea. Some urban needs could be satisfied through intensive development of small nodes within metropolitan parks where they lie within densely populated areas. Existing public lands, currently underdeveloped, should be developed more intensively while maintaining as natural a setting as possible.

All existing publicly owned land, consisting chiefly of metropolitan park district lands, should be developed more intensively to provide additional recreational opportunities of Class II type. Since the level of development on this land is quite low, additions can be provided easily without producing overdevelopment. Some of these lands can accommodate facilities for recreational activities not now provided for. Recreational development at West Branch Reservoir, Tinkers Creek State Park, and the River Styx Recreation Area should be completed as rapidly as possible. New lands will have to be acquired in the planning subarea to satisfy much of the recreational needs.

The following elements are proposed for acquisition and development. Priorities for certain elements are critical because, if they are not acquired in the near future, they may not be available at a later time.

(1) Land in the Cuyahoga River valley and easements on the valley wall lands should be acquired as set forth in the "Cuyahoga River Valley of Ohio, A Recreational Feasibility Study."[38]

(2) The Lakeshore Park Beach in Lake County, listed in the State plan, should be acquired and developed.

(3) Additional lands on the Berlin Reservoir should be acquired as needed and additional recreational facilities installed.

(4) Land should be acquired and an impoundment and recreational facilities on the upper part of the Chagrin River should be developed.

(5) Lands along the Rocky River valley in Medina County, and the lower Grand and Chagrin River valleys should be acquired and developed.

The following should be given priority during 1980–2000:

(1) Acquisition and development of lands along the Black River should proceed. Acquisition and development of lands along river valleys in higher priorities should be continued toward completion.

(2) Land should be acquired and developed for recreational use on the Mogadore Reservoir near Akron.

(3) Wildlife areas with development potential for certain activities should be developed to their optimal level.

During the 2000–2020 period:

(1) Intensification of development should be initiated on those metropolitan park areas having the potential to support increased development.

(2) Lands on the upper Cuyahoga River and the Conneaut River valleys should be acquired and developed.

(3) The Lake Erie beach east of Conneaut should be acquired and developed.

The following miscellaneous items should be given priority during the 1970–2020 time frame:

(1) Provision of additional access sites in suitable places on Lake Erie and its tributary streams

(2) Reclamation of polluted beach areas along the Lake Erie shore in and near the Cleveland area

(3) Acquisition of land and development of small impoundments and recreational facilities under Public Law 566

4.6.12 Planning Subarea 4.4

This planning subarea includes Erie County, Pennsylvania, and Cattaraugus, Chautauqua, Erie, and Niagara Counties, New York. The northern portion of Niagara County actually drains into the Lake Ontario basin, but has been included in Planning Subarea 4.4 (Lake Erie Northeast) for planning purposes (Figure 21–79).

A relatively narrow lake plain extends along the shoreline reaching its greatest width in the vicinity of Buffalo. Inland from the plain is a glaciated plateau which provides a gently rolling character to the terrain. Niagara Falls, an important scenic attraction for the nation, is located in this planning subarea.

More than 1.8 million people live in this area, most of them residing near the shores of Lake Erie and the Niagara River. The largest cities include Buffalo (500,000), Niagara Falls (100,000), and Erie (140,000).

Gross acreage available for recreation in this planning subarea is approximately 146,500 acres. Most of this is in State forests and parks. Inland water acreage adds nearly 12,400 acres, and the Great Lakes add another 96,000 acres for recreation.

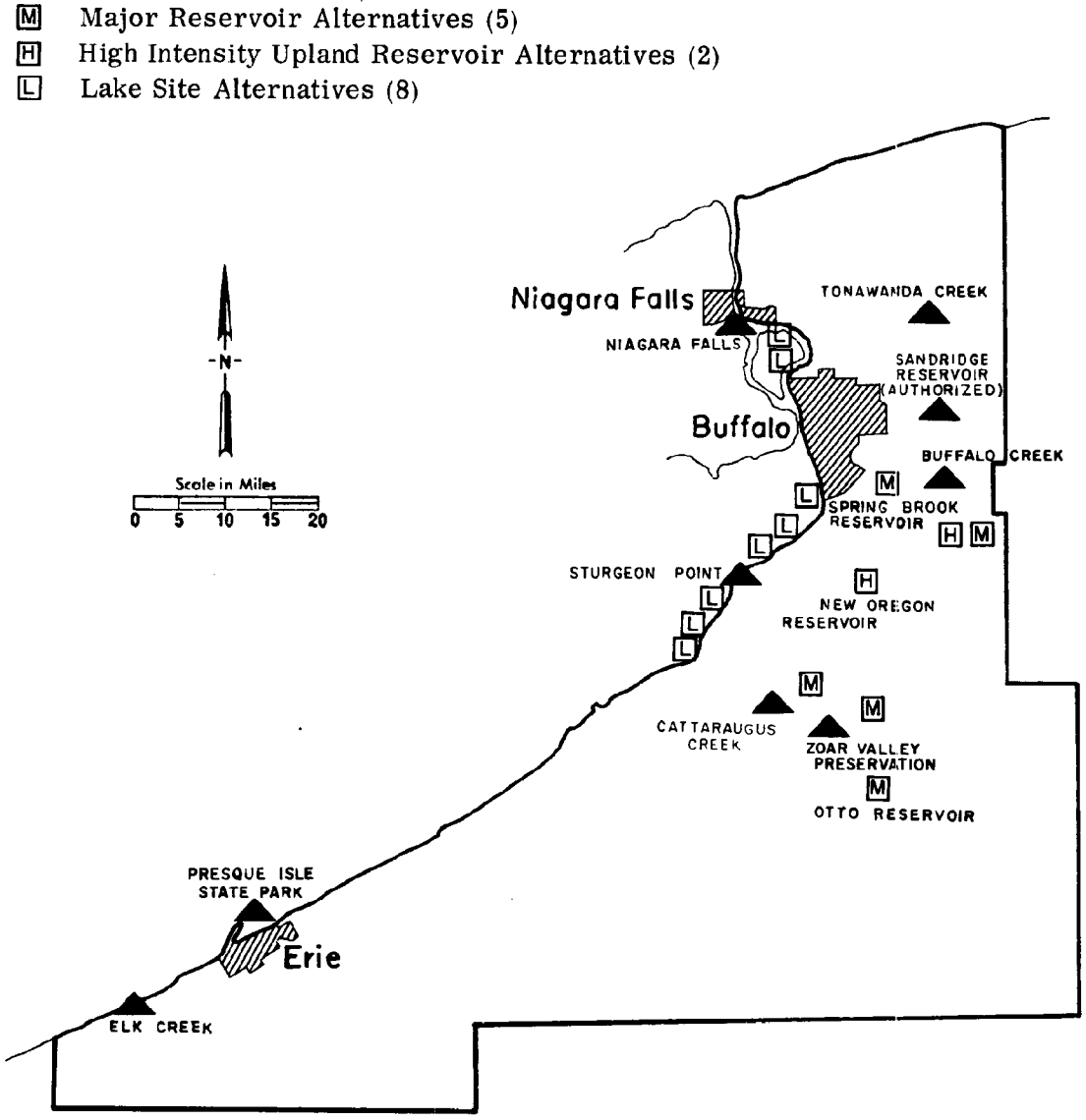


FIGURE 21–79 Reference Map for Planning Subarea 4.4

The 1970 gross recreational requirement was almost 28 million recreation days. This is expected to increase to approximately 75 million recreation days by 2020. In 1970 the water-oriented recreational requirement was estimated to be more than seven million recreation days, projected to increase to 20 million recreation days by 2020.

4.6.12.1 Estimate of Needs

(1) Urban Land Needs

Nearly 70 percent of this planning subarea's effective population is derived from urban areas. Therefore, it is not surprising that the greatest acreage need is for playfields, an urban-oriented activity. Nearly 1,800 acres were needed in 1970. By 2020 this will be 8,000 acres. Another day-use activity, golfing, showing an acreage need of 1,400 acres in 1970, will be almost 11,000 acres by 2020. In addition, some 400 acres of beach areas for swimming will be needed in 2020.

A total of 3,800 acres of Class I recreation land was needed in or near urban centers in

Courtesy of Niagara Frontier State Park Commission

FIGURE 21–80 Evangola State Park, New York. Beaches on this part of Lake Erie are limited in extent and are heavily used.

1970. By 2020 this need for land acquisition and intensive development will grow to 22,000 acres. There is adequate reason for an interim report of Pennsylvania's Statewide Outdoor Recreation Plan[43] to state that intensive acquisition of urban parks is a policy goal for Erie County.

(2) Nonurban Land Needs

Although no developed acreage needs were stated for swimming (Figure 21–80), picnicking, or camping in this planning subarea in 1970, New York indicated such needs by letter. These are expected to reach 400 acres for swimming, 1,400 for picnicking, and 2,200 acres for camping in 2020. Approximately 300 acres of developed ski areas were needed in 1970, and an additional 190 acres by 2020. Foot, horse, and bicycle trails are also needed, but can be constructed within the undeveloped buffer zones around developed recreational areas and do not require additional land.

To have met the 1970 Class II recreation area requirements, approximately 6,100 acres of land should have been acquired and developed outside the urban centers. By 2020, this need is expected to reach 50,000 acres.

(3) Total Needs for Recreation Land

In 1970, 9,900 acres were needed for additional recreation land in this planning subarea. This will increase to nearly 72,000 acres by 2020. Table 21–36 portrays the recreational requirements, supply, and needs by activity for Planning Subarea 4.4 for each of the target years.

(4) Water Needs

No water surface needs are evident until 2000, when 35,000 acres will be needed. This need will increase to nearly 86,000 acres by 2020. It should be emphasized, however, that several reservoirs (Pymatuning in Pennsylvania and Ohio, Allegheny in Pennsylvania and New York, and the Finger Lakes in central New York) lying just outside the study area, have in the past provided significant recreational opportunities. These resources will probably continue to absorb much of the estimated requirements of this planning subarea.

4.6.12.2 Problems

Approximately 1.5 miles of Lake Erie beaches in Chautauqua County, New York, have become polluted (Figure 21–81) to such a degree that they have been closed to swimming. Portions of the Presque Isle beaches, Pennsylvania, are experiencing severe erosion problems.

4.6.12.3 Suggestions for Future Action

A significant potential supply exists within the area, consisting of a number of reservoir sites and areas that, if developed, could eventually provide recreational opportunities at strategic locations for large numbers of people. There is one authorized Corps of Engineers reservoir in this area, Sandridge Reservoir. It is located due east of Buffalo on Ellicott Creek. The surface area of the conservation pool would be 2,150 acres. Its primary

purposes would be flood control, low-flow augmentation, recreation, fish and wildlife habitats, and water supply. This reservoir and several others are included in the early-action Comprehensive Water Resources Plan[6] developed by the Erie-Niagara Basin Regional Water Resources Planning Board.

There are also several proposed reservoirs in this planning subarea. Spring Brook Reservoir, located southeast of Buffalo on Cazenovia Creek, would have a conservation pool surface area of 1,600 acres. Its primary purposes would include flood control, low-flow augmentation, erosion control, recreation, and fishing. Otto Reservoir would be located on the South Branch of Cattaraugus Creek, would have a conservation pool of 4,450 acres, and would provide limited flood reduction as well as water quality, irrigation, fish and wildlife, and recreation benefits. Several proposed small reservoirs are also set forth in the plan developed by the Erie-Niagara Water Resources Board. New Oregon Reservoir would provide significant recreational benefits, while Eastland and Thatcher (and possibly Spencer) Reservoirs could provide additional recreation benefits. Development of Sturgeon Point State Park and preservation of an 18-mile reach of scenic Zoar Valley on Cattaraugus Creek is also recommended in the Board Plan.

Other major potential areas include flood plains, especially near urban areas, and State forests. The flood plains of Tonawanda Creek, Buffalo Creek, and Cattaraugus Creek offer substantial potential for recreational development and use. The flood plains of numerous smaller streams also offer significant potential for development.

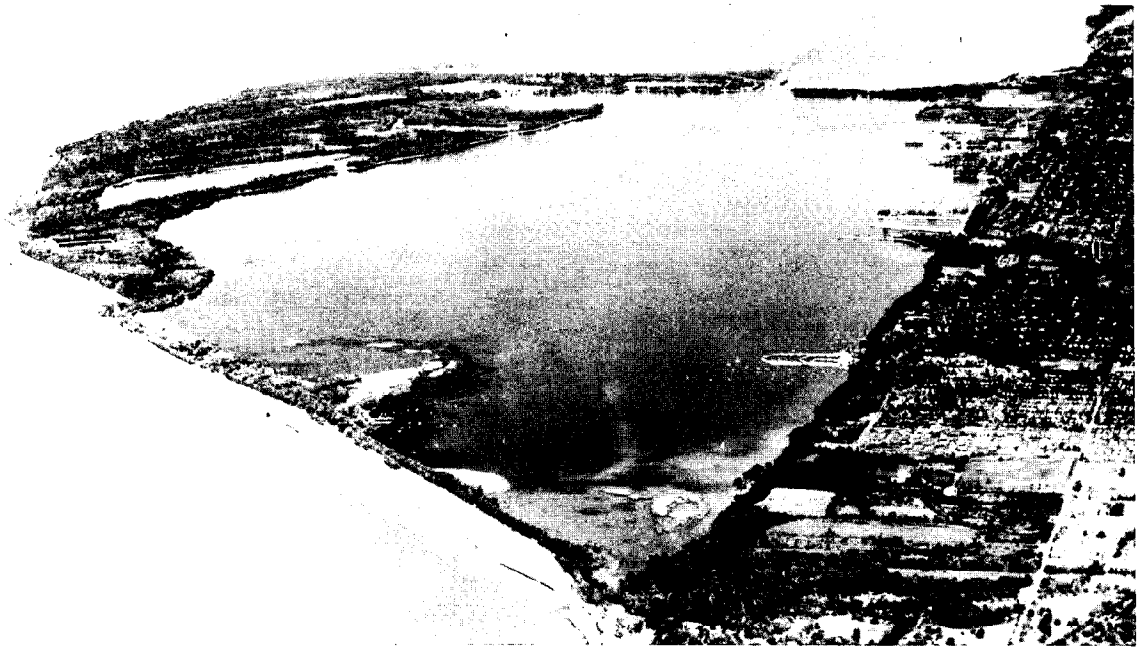
The Pennsylvania Game Commission is currently considering acquisition of approximately 140 acres of land in Erie County. This will be maintained and used solely for hunting purposes.

The Pennsylvania Department of Environmental Resources is aware of one recreation site in the region with potential for day-use activities and marine facilities. This site is located along Elk Creek where it feeds into Lake Erie.

A State park is also proposed at Sturgeon Point on Lake Erie in New York State. It would include 535 acres of land with two miles of lakefront.

Courtesy of Environmental Protection Agency

FIGURE 21–81 A Symptom of Pollution. Heavy industrial pollution dirties water, kills fish, and deposits vegetation.



Courtesy of Pennsylvania Department of Environmental Resources

FIGURE 21–82 Presque Isle State Park. This park accommodates nearly 4,000,000 annual visits.

The proposed North Country Trail may eventually pass through this planning subarea. This trail, plus any spur trails that may be developed, would help satisfy some of the needs for hiking and related activities.

The 1966 New York Statewide Comprehensive Outdoor Recreation Plan[32] lists several action programs applicable to the Great Lakes Basin. They include programmed development of 14 State parks, two county parks, one multiple-use area, and one boat launching site. Six county parks are to be acquired and developed, and 12 additional parks are to be acquired. Pennsylvania has programmed additional development for Presque Isle State Park at Erie (Figure 21–82).

There are more than 47,000 acres of State forest in Cattaraugus and Chautauqua Counties. The development of one-half of one percent of these lands would provide an additional 240 acres of intensively developed land for recreational use. The 10,000 acres of game management and multiple-use lands could provide an additional 50 acres of intensively developed recreational lands.

Adequate public access should be provided to all existing lakes and streams. Additional harbors of refuge on Lake Erie could provide better utilization of this water resource. Alternatives listed by New York State are summarized in Table 21–35.

4.6.12.4 Plan Design

For much of the Class I type recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea. Existing public lands, currently underdeveloped, should be developed more intensively while maintaining a setting as natural as possible.

For Class II type recreational areas, all existing publicly owned land, consisting chiefly of State and county parks, should be developed more intensively to provide additional opportunities. Since the level of development is below optimum, additional development of Class II lands can be provided easily without producing overdevelopment. Some areas can accommodate facilities for recreational activities not provided.

New lands will have to be acquired in the planning subarea to satisfy much of the recreational needs. In addition to the items above, the following elements should be given priority during the 1970–1980 time period:

(1) acquisition and development of the Sandridge, Spring Brook, Otto, Thatcher, Eastland, Spencer, and New Oregon Reservoirs

(2) completion of acquisition and development of Sturgeon Point State Park

(3) acquisition and initial development of

TABLE 21-35 Potential Recreation Measures, Planning Subarea 4.4

Measure	Est. Recreation Days Capacity (1000s) Peak Days	Annual
Needs (to 1980)	143	NA
Early Action Plan (to 1980)		
Sandridge Reservoir	21	1,240
Spring Brook Reservoir	31	1,420
Otto Reservoir	18	780
New Oregon Reservoir	11	520
Thatcher Reservoir	1	50
Eastland Reservoir	1	30
Spencer Reservoir	NA*	95
Sturgeon Point Recreation Site	9	420
Zoar Valley Preservation	NA	175
Flood Plain Acquisition and Development (10 miles)	NA	NA
Lake Erie Pollution Control	NA	NA
Needs (1980-2020)	340	NA
Alternatives (1980-2020)		
Major Reservoirs (3)**	NA	1,926
Great Lakes Recreation Sites (5)	NA	2,164
Upland Reservoirs--High Intensity Use (1)	NA	570
Upland Reservoirs--Low Intensity Use (16)	NA	2,094
Flood Plain Acquisition and Development (45 miles)	NA	NA
State Park Acquisition and Development (4)	NA	2,728
Access Sites	NA	NA
Private Development	NA	NA
Outside PSA Development	NA	NA

*Not Available
**Number of Areas
Reference: Erie-Niagara Basin Comprehensive Water Plan, December 1969

10 miles of flood plains—3,200 acres—on and near urban areas

(4) development of recreational facilities on State forest and game lands

(5) control of water pollution in the vicinity of Presque Isle State Park

(6) the reclamation of polluted beaches along the Lake Erie shore in and near the Buffalo area

(7) preservation of Zoar Valley through land use regulation

These items should be considered during 1980–2000:

(1) completion of those elements above not completed

(2) continued development of recreational facilities on State forest and game lands, at multiple- and single-purpose reservoirs, and at Great Lakes recreation sites

(3) acquisition and development of an additional 15 miles of flood plains amounting to 4,800 acres of land

The following should be given priority during the 2000–2020 period:

(1) acquisition and development of four new State parks of 2,000 acres each

TABLE 21–36 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 4.4

Activity	1970			1980			2000			2020		
	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs	Reqmnt	Supply	Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	200	200	0	280	200	80	430	200	230	600	200	400
Picnicking	1,190	1,190	0	1,440	1,190	250	1,920	1,190	730	2,560	1,190	1,370
Camping	820	820	0	1,250	820	430	1,980	820	1,160	3,000	820	2,180
Parking (General)	430	480	0	570	480	90	830	480	350	1,150	480	670
Parking (Boats & Water-Skiing)	210	40	170	310	60	250	470	60	410	700	60	640
Subtotal	2,850	2,730	170	3,850	2,750	1,100	5,630	2,750	2,880	8,010	2,750	5,260
Acres of Developed Land for Other Summer Activities												
Playfields	2,360	510	1,850	3,420	510	2,910	5,620	510	5,110	8,110	510	7,600
Golf	3,840	2,400	1,440	5,520	2,400	3,120	9,160	2,400	6,760	13,100	2,400	10,700
Subtotal	6,200	2,910	3,290	8,940	2,910	6,030	14,780	2,910	11,870	21,210	2,910	18,300
Acres of Developed Land for Winter Activities												
Snow Skiing	340	10	330	360	10	350	430	10	420	530	10	520
Sledding	420	0	420	520	0	520	800	0	800	1,220	0	1,220
Ice Skating	30	20	10	50	20	30	70	20	50	120	20	100
Subtotal	790	30	760	930	30	900	1,300	30	1,270	1,870	30	1,840
Total Acres of Developed Land	9,840	5,670	4,220	13,720	5,690	8,030	21,710	5,690	16,020	31,090	5,690	25,400
Acres of Water Surface												
Boating (including Canoeing, sailing & water-skiing)	51,000	97,000	0	75,000	97,000	0	123,000	97,000	26,000	183,000	97,000	86,000
Miles of Trails												
Hiking & Nature Walks	200	40	160	300	40	260	450	40	410	630	40	590
Bicycling	380	0	380	450	0	450	590	0	590	770	0	700
Horseback Riding	90	0	90	110	0	110	160	0	160	220	0	220
Total Miles of Trail	670	40	630	860	40	820	1,200	40	1,160	1,620	40	1,580
Total Needs for New Lands for Recreation (Acres)												
Class I			3,800			7,100			14,100			22,500
Class II			6,100			12,500			28,300			49,700
Total Land Needs			9,900			19,600			42,400			72,200
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			0			4,000			15,900			32,400
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	27,820			36,856			53,958			75,288		
For water-oriented recreation activities (1000s)	7,233			9,865			14,426			20,412		

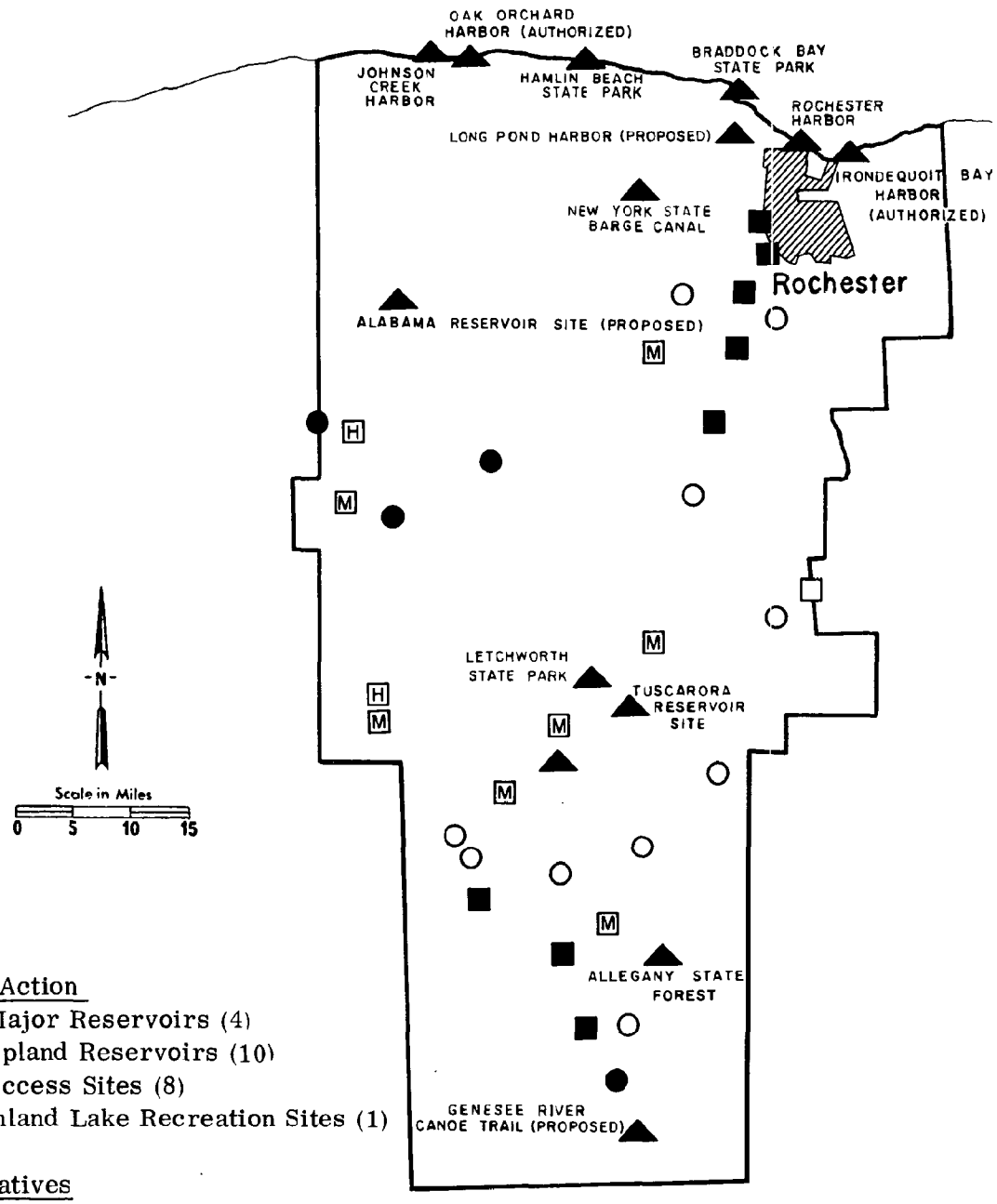


FIGURE 21–83 Reference Map for Planning Subarea 5.1

(2) acquisition and development of an additional 30 miles of flood plains amounting to 9,600 acres of land

Miscellaneous items that should be considered during the entire period are:

(1) the provision of additional access sites in suitable places on Lake Erie and its tributary streams

(2) the acquisition of land and development of small impoundments and recreation facilities under Public Law 566

4.6.13 Planning Subarea 5.1

Planning Subarea 5.1 consists of six counties in western New York State and includes Rochester (Figure 21–83). It is drained primarily by the Genesee River basin and lies along the southern shore of Lake Ontario.

Topographically, this planning subarea is characterized by flat to rolling lake plains in the northern one-third and a glaciated plateau in the remaining two-thirds of the area. A broad, rolling topography is characteristic of the plateau, with most of the valleys oriented in a north-south direction. The vast amount of land in agriculture gives this planning subarea a decidedly rural setting, although more than three-fourths of the effective population is derived from SMSAs in and near it.

Gross land available for recreation in the planning subarea is 94,500 acres. Most of this is located in State forests and parks. In addition to the land, approximately 38,000 acres of water surface area are available for recreation on the Great Lakes and 10,000 on inland lakes.

The 1970 recreational requirements were more than 21 million recreation days. This is expected to increase to nearly 59 million recreation days by the year 2020. Water-oriented recreational requirements in 1970 were estimated to be over six million recreation days, and are expected to increase to more than 18 million by 2020.

4.6.13.1 Estimate of Needs

(1) Urban Land Needs

The presence of large population concentrations around Planning Subarea 5.1, coupled with increasing population, income, mobility, and leisure time, increases pressure on recreational facilities, particularly the day-use type. It is not surprising, therefore, to see from Table 21–38 that the greatest developed-facility acreage needs for each target year are for playfields and golf courses. A modest need of 70 acres for swimming beach in 1970 will grow to 310 acres by 2020. There was a need for 320 miles of bicycle trails in 1970, which is estimated to grow to 680 miles in 2020. Total needs for Class I recreational lands were estimated at approximately 3,600 acres in 1970, and projected to more than 17,000 acres by 2020.

(2) Nonurban Land Needs

Total developed land needs for nonurban, or Class II, recreation areas amounted to 450 acres in 1970. These are expected to increase to 820 acres in 1980, 1,620 acres in 2000, and 3,040 acres in 2020. Approximately 250 acres of the needed acres can be developed on existing publicly owned lands. Therefore, total need for new lands amounted to 4,300 acres in 1970 and is expected to increase to 25,000 acres by 2020.

Since travel patterns were not considered, it is conceivable that such estimates are low. For instance, this study indicates no camping needs for 1970 and 1980. By comparison, the Genesee River Basin Type II Study[56] showed an immediate need for 1,300 camping units. Such discrepancies occur in other activities as well.

(3) Total Land Needed for Recreation

Land that must be acquired and developed to meet the recreational needs will grow from approximately 7,900 acres in 1970 to nearly 42,000 acres by 2020. Table 21–38 portrays recreational requirements, supply, and needs by activity for Planning Subarea 5.1 for each of the target years.

(4) Water Needs

There were no surface-water acreage needs for 1970. Between 1980 and 2020, surface-water acreage needs are expected to increase from 18,000 acres to 116,000 acres.

4.6.13.2 Problems

The recreational needs of the planning subarea will not be easily met. In addition to the problems listed in Subsection 4.5, a critical obstacle in meeting these needs is the amount of Lake Ontario beach acreage available to the public. According to the beach inventory for the International Joint Commission study,[16] Monroe and Orleans Counties have only 34 acres of beach, of which 25 acres are privately owned. Seven of the nine acres in public ownership and one-half of the privately owned beaches were heavily polluted at the time of the survey in 1967. Thus, the oppor-

tunity to develop recreational facilities on the lakeshore is extremely limited.

4.6.13.3 Suggestions for Future Action

In State and county parks larger than 500 acres, only 800 of a total of 24,000 acres have been developed for intensive recreational use. If 15 percent of these areas are ultimately developed for intensive use, an additional 2,800 acres of developed land could be made available.

In 1969, Allegany State Forest contained no recreational development. Assuming that one-half percent can be developed for recreational use, this area could provide an additional 200 acres of intensive recreational development for such activities as camping, hiking, picnicking, and sightseeing.

The *Genesee River Basin* (GRB) and the *Erie-Niagara Basin* (ENB) *Comprehensive Studies* list several potential reservoir sites in this planning subarea:

(1) Sierks and Linden sites on Tonawanda and Little Tonawanda Creeks have a combined conservation pool surface area of 1,730 acres. The reservoirs would be operated as one system to maximize multi-purpose benefits (ENB early-action plan).

(2) Stannard site on the Genesee River would have a conservation pool of 2,300 acres (GRB early-action plan, Appalachia Regional Commission).

(3) Portage site on the Genesee River above Letchworth State Park would have a conservation pool of 4,100 acres (GRB deferred for further study).

(4) Summit site on Black Creek in Allegany County would have a conservation pool of 1,700 acres (GRB early-action plan).

(5) Tuscorora site on Keshequa Creek would have a conservation pool of 800 acres (GRB long-range plan).

(6) Oatka Creek site would contain a conservation pool of 640 acres (GRB long-range plan).

(7) Wiscoy Creek site would have a full pool of 900 acres (GRB long-range plan).

(8) Angelica site on Black and Angelica Creeks would have a conservation pool surface area of 900 acres.

The Genesee plan also recommended construction of 11 Soil Conservation Service structures on small watersheds. A number of access sites were proposed for development on the New York State Barge Canal and the Genesee River. Four small-boat harbors were proposed for development on Lake Ontario.

A stretch of the Genesee River in Allegany County was proposed for a canoe trail. The Finger Lakes Trail is being built across Allegany and Wyoming Counties. Alternatives listed by New York State are summarized in Table 21-37.

The proposed North Country Trail may eventually pass through the area. This trail, plus any spur trails that may be developed, would help satisfy some of the needs for hiking and related activities.

4.6.13.4 Plan Design

For all Class I type recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea, especially in the Rochester area. Existing public lands, currently underdeveloped, should be developed more intensively while maintaining a setting as natural as possible.

For Class II type recreational areas, all existing publicly owned land, consisting largely of State parks and forests, should be developed to its optimal capacity. Since the level of development on this land is relatively low, additional improvements could easily be made without overdevelopment. Some of these lands can accommodate facilities for recreational activities not now provided. New lands should be acquired in the planning subarea to satisfy most of the recreation needs projected by 2020.

The 1966 Statewide Comprehensive Outdoor Recreation Plan for New York[32] shows that seven State parks in the planning subarea are programmed for development. In addition, four county parks are programmed for acquisition and development, three for development only, and three for acquisition only.

There are seven existing or potential Corps of Engineers harbors of refuge for use by small craft on Lake Ontario in this area. They include:

(1) Johnson Creek—natural or non-Federal harbor of refuge

(2) Oak Orchard Harbor—authorized Federal small-boat harbor, not yet constructed

(3) Hamlin Beach State Park—survey report underway

(4) Braddock Bay State Park—survey report underway

(5) Cranberry and Long Ponds—survey report underway

TABLE 21-37 Potential Recreation Measures, Planning Subarea 5.1

Measure	Est. Recreation Days Capacity (1000s) Daily	Annual
Needs (to 1980)	NA*	13,950
Early Action Plan (to 1980)		
Stannard Reservoir	NA	338
Sierks-Linden Reservoir Complex	21.9	1,000
Genesee River and Barge Canal Access Sites (8)**	NA	600
Upland Reservoirs (12)	NA	2,200
Inland Lake Recreation Areas (2)	NA	NA
River Valley Acquisition and Development (10 miles)	NA	860
Lake Ontario Pollution Control	NA	NA
Outside PSA Development	NA	NA
Needs (1980-2020)	NA	65,350
Alternatives (1980-2020)		
Major Reservoirs (3)	NA	1,903
Major Reservoirs (3)	75.6	3,217
Major Reservoir (1)	NA	NA
Major Reservoir (1)	6.8	288
Upland Reservoirs--High Intensity Use (2)	NA	1,033
Upland Reservoirs--Low Intensity Use (11)	NA	1,100
Upland Reservoir (1)	NA	NA
Harbors of Refuge (16)	NA	NA
Finger Lakes Trail System Additions	NA	NA
Alma Pond Natural Area	NA	NA
Access Sites	NA	NA
Expansion at Existing Facilities	NA	14,850
River Valley Acquisition and Development (20 miles)	NA	1,720
Private Development	NA	NA
Outside PSA Development	NA	NA

*Not Available
**Numbers of Areas

(6) Rochester Harbor—authorized Federal deep-draft harbor, completed
(7) Irondequoit Bay—authorized Federal small-boat harbor, not yet constructed

In addition to the items above, the following elements should be given priority for acquisition and development in the 1970-1980 time period:

(1) Sierks and Linden Reservoirs
(2) Stannard Reservoir
(3) Soil Conservation Service Site 7-2 (Summit Reservoir Site)
(4) twelve additional upland reservoir sites
(5) ten miles of the Genesee River valley
(6) eight Genesee River and Barge Canal recreation sites

These items should be given acquisition and development priority, 1980-2000:

(1) Portage Reservoir
(2) Tuscarora Reservoir

TABLE 21–38 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 5.1

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	110	40	70	160	40	120	250	40	210	350	40	310
Picnicking	640	460	180	790	460	330	1,080	460	620	1,450	460	990
Camping	400	890	0	620	890	0	1,000	890	110	1,550	890	660
Parking (General)	230	210	20	320	210	110	470	210	260	660	210	450
Parking (Boats & Water-Skiing)	180	0	180	260	0	260	420	0	420	630	0	630
Subtotal	1,560	1,600	450	2,150	1,600	820	3,220	1,600	1,620	4,640	1,600	3,040
Acres of Developed Land for Other Summer Activities												
Playfields	1,140	300	840	1,620	300	1,320	2,540	300	2,240	4,100	300	3,800
Golf	3,300	1,000	2,300	4,780	1,000	3,780	8,100	1,000	7,100	11,760	1,000	10,760
Subtotal	4,440	1,300	3,140	6,400	1,300	5,100	10,640	1,300	9,340	15,860	1,300	14,560
Acres of Developed Land for Winter Activities												
Snow Skiing	290	20	270	310	20	290	380	20	360	480	20	460
Sledding	360	0	360	450	0	450	720	0	720	1,100	0	1,100
Ice Skating	30	30	0	40	30	10	70	30	40	110	30	80
Subtotal	680	50	630	800	50	750	1,170	50	1,120	1,690	50	1,640
Total Acres of Developed Land	6,680	2,950	4,220	9,350	2,950	6,670	15,030	2,950	12,080	22,190	2,950	19,240
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	43,000	48,000	0	66,000	48,000	18,000	106,000	48,000	58,000	164,000	48,000	116,000
Miles of Trails												
Hiking & Nature Walks	170	40	130	260	40	220	400	40	360	560	40	520
Bicycling	320	0	320	380	0	380	510	0	510	680	0	680
Horseback Riding	80	20	60	100	20	80	140	20	120	200	20	180
Total Miles of Trail	570	60	510	740	60	680	1,050	60	990	1,440	60	1,380
Total Needs for New Lands for Recreation (Acres)												
Class I			3,600			6,000			10,900			17,100
Class II			4,300			7,200			13,700			25,400
Total Land Needs			7,900			13,200			24,600			42,500
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			1,300			3,800			9,100			18,600
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	21,648			28,598			41,417			58,627		
For water-oriented recreation activities (1000s)	6,234			8,587			12,806			18,359		

(3) Oatka Reservoir
(4) Wiscoy Reservoir
(5) four upland reservoirs
(6) ten miles of Genesee River valley

The following should be given priority for acquisition and development during the 2000–2020 time period:

(1) Angelica Reservoir
(2) Bennington Reservoir
(3) four Soil Conservation Service reservoirs—total of 2,000 acres of land
(4) ten miles of Genesee River valley

These items should be given priority for acquisition and development throughout the 1970–2020 time period:

(1) development of additional recreational facilities on State forest lands
(2) development of recreational facilities on public wildlife areas
(3) public access sites on streams and lakes where additional potential for use exists

4.6.14 Planning Subarea 5.2

Planning Subarea 5.2 (Figure 21–84) encompasses a 12-county area in north central New York and is characterized by an extensive lake plain sloping toward Lake Ontario in the northern one-third and the Appalachian Plateau in the southern two-thirds. Significant features include the Tug Hill Plateau in the eastern part of the area and the famous Finger Lakes in the Appalachian Plateau.

This planning subarea is not only the largest in the Lake Ontario basin, but also the most populous. Approximately 1.3 million people reside within its boundaries. Even though much of the land has a definite rural character, nearly three-fourths of the effective population is derived from SMSAs. The larger cities include Syracuse (216,000) Utica (100,000), Rome (53,000), and Auburn (35,000).

The gross land available for recreation is 159,000 acres. Most of this is in State forests. An additional 40,000 acres are managed for game. In addition to land acreage, the amount of water surface available for recreation is 51,000 acres on Lake Ontario and 169,600 acres on inland lakes.

The total 1970 recreational requirements were more than 37 million recreation days. By the year 2020, these requirements are expected to reach nearly 107 million recreation days. Water-oriented recreation days in 1970 were almost 10 million, and it is estimated that requirements will reach almost 29 million by 2020.

4.6.14.1 Estimate of Needs

(1) Urban Land Needs

This study indicates that the greatest developed-facility acreage need in 1970 was for playfields. This need is maintained through the year 1980. By the year 2000, the need for golf courses exceeds that for playfields. There is substantial need for nature and bicycle trails as well as for sledding and ice skating areas. The total needs for Class I recreation lands were 4,100 acres in 1970. They are estimated to increase to nearly 29,000 acres by 2020.

(2) Nonurban Land Needs

Nearly one-fourth of the total developed acreage needs are allocated for nonurban areas and activities. Before 1980, based on the requirements-supply-needs analysis for swimming, camping, and picnicking, only additional swimming beaches are needed. Additional camping and picnicking facilities are needed after 1980. Once again, however, it must be stressed that the methodology used in this study has not accounted for travel patterns. Therefore, the estimated needs in Table 21–40 may be short of the actual needs for this planning subarea. In comparison, the New York Statewide Comprehensive Outdoor Recreation Plan of 1966[32] and the 1970 recreation study of the Basin both showed a definite need for additional camping and picnicking facilities and proposed additional development for these activities. The 1966 plan sets forth a program to more than double the number of campsites in both State parks and campsite areas in this area over a 10-year period. It also proposed to increase picnicking facilities by nearly 50 percent. Total needs for Class II recreational lands were 12,000 acres in 1970, and nearly 48,000 acres by 2020.

(3) Total Land Needed for Recreation

Land which must be acquired to meet the total recreational needs will increase from approximately 16,000 acres in 1970 to more than 76,000 acres by 2020. Table 21–40 portrays recreational requirements, supply, and needs by activity for Planning Subarea 5.2 for each of the target years.

(4) Water Needs

The water supply base in this planning subarea appears to be adequate to meet water surface acreage requirements until after the

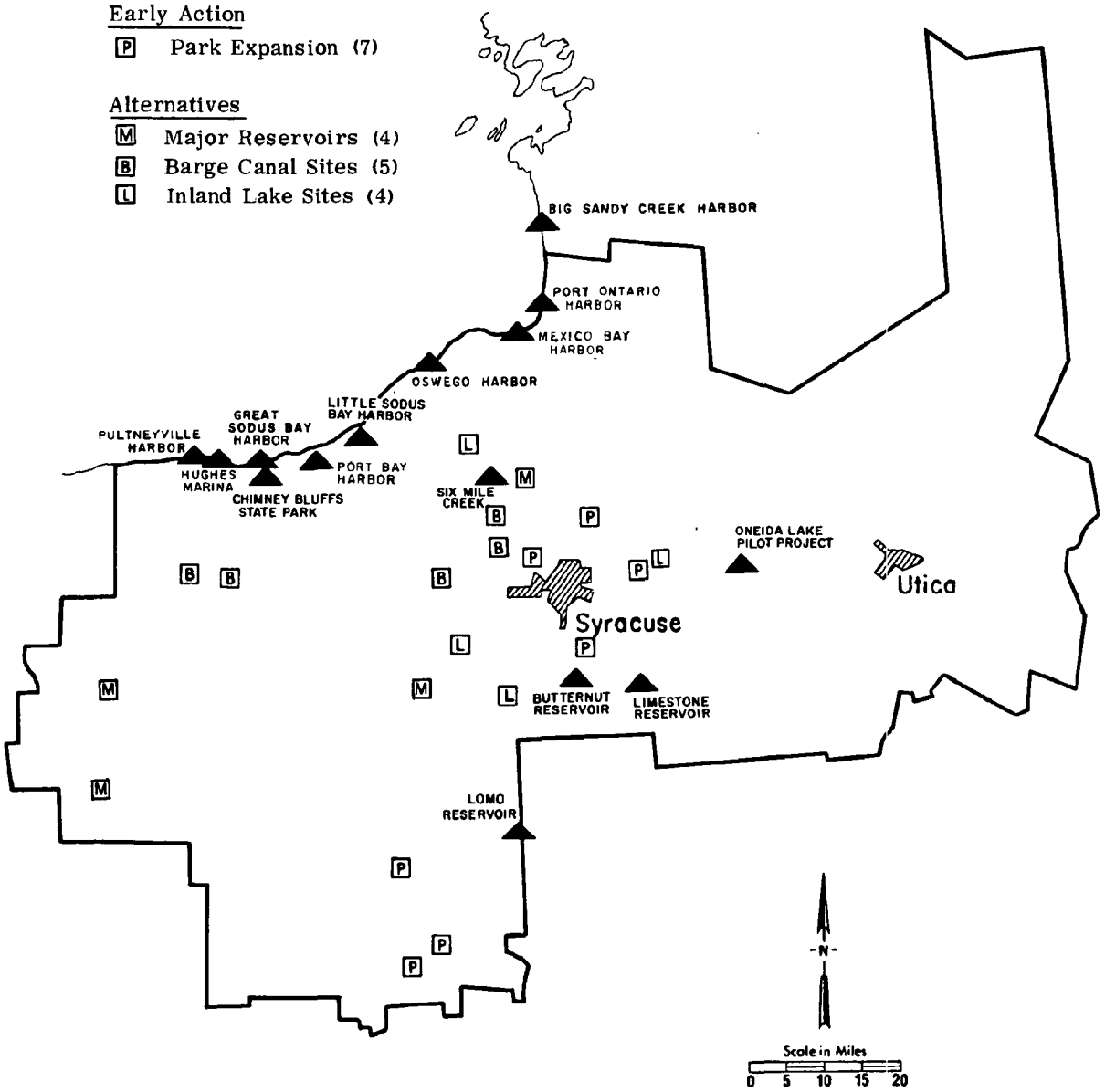


FIGURE 21–84 Reference Map for Planning Subarea 5.2

year 2000. By the year 2020, the need for water surface will amount to 7,000 acres.

4.6.14.2 Problems

Problems applicable to this planning subarea have been discussed in a general manner in Subsection 4.5 and will not be repeated here.

4.6.14.3 Suggestions for Future Action

If most of the needs are to be met in this planning subarea, development of existing recreational lands and acquisition and development of new lands will be necessary. New areas with the greatest natural qualities for recreational development occur along flood plains of the larger streams, on lake shores—especially inland lake shores—and on the

rugged and forested Appalachian Plateau.

The numerous lakes in this area should be examined for their potential to qualify as scenic lakes and to provide additional recreational opportunities. Those that qualify as scenic lakes should be protected and maintained in their natural state. Remaining lakes and adjacent land should be developed to their optimal level.

The proposed North Country Trail may eventually pass through the planning subarea. This trail, plus any spur trails that may be developed, would help satisfy some of the needs for hiking and related activities.

According to the International Joint Commission beach study,[16] all beach areas along Lake Ontario in this planning subarea are available to the public; many of them are in public ownership. Thus, acquisition of lands for recreational development on Lake Ontario may require construction of new beach areas if swimming opportunities are to be provided.

The Hector Land Use Area is Federal land located in the center of the Finger Lakes region and managed for multiple use by the U.S. Forest Service. It is used as a recreation area on a year-round basis, from summer camping to winter snowmobiling. Emphasis has been placed on dispersed recreation such as hunting, hiking, snowmobiling, and primitive camping, to complement intensively developed recreational facilities along the surrounding lakes. One developed campground has been established and more are planned. Included in the 14-mile trail system is a section of the Finger Lakes Trail. Hunting, fishing, and wildlife study are enhanced by some 20 small man-made water impoundments. This Federal area has excellent potential for meeting some recreational requirements in the Finger Lakes area.

The 1966 Statewide Comprehensive Outdoor Recreation Plan for New York showed that 15 State parks in the planning subarea were programmed for development. Five county parks were programmed for acquisition and development, and four for development only. Three multiple-use study areas were also programmed in addition to these parks.

There are seven existing or potential harbors of refuge for use by small craft on Lake Ontario in this planning subarea:

(1) Pultneyville Harbor—study deferred pending receipt of agreement for local cooperation

(2) Highes Marina—a private harbor two miles east of Pultneyville; no Federal plans

(3) Great Sodus Bay Harbor—existing Federal deep-draft harbor

(4) Little Sodus Bay Harbor—existing Federal deep-draft harbor; no commerce for several years; currently being maintained as a small-boat harbor

(5) Oswego Harbor—existing Federal deep-draft harbor

(6) Mexico Bay Harbor—small-boat harbor; study authorized, but not yet started

(7) Port Ontario Harbor—authorized Federal small-boat harbor; further study not yet underway

In this planning subarea there are nearly 40,000 acres of land in game management areas. At a one percent level of development, this land could provide 400 acres of land for development with recreational facilities. Activities should be limited to remote camping, picnicking, boating where water is available, and wildlife observation and photography.

Nearly 130,000 acres are managed as State forest lands. They include 300 acres of wetland and 275 acres of water surface. These lands can provide substantial opportunities for extensively developed remote type activities, including camping, picnicking, hiking, nature study and photography, and boating where water is available. If one-half of one percent of the State forest lands were developed for recreational use, 650 acres of additional recreation lands would become available.

Additional recreation opportunities for the future should be provided by the acquisition and development of new parks on lakeshores and streams. These areas should be strategically located with respect to urban areas. Alternatives listed by the State of New York are presented in Table 21–39.

The private sector also has considerable potential for quality recreational development. With encouragement, this sector of the economy could help satisfy a portion of the planning subarea's recreational needs.

4.6.14.4 Plan Design

For all Class I type recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea. These recreation areas should range from small intensively developed areas such as tot-lots to neighborhood and community parks of 100 acres or more. These areas should be oriented solely toward day-use activities including outdoor games and sports,

TABLE 21-39 Potential Recreation Measures, Planning Subarea 5.2

Measure	Est. Recreation Days Capacity (1000s) Daily	Annual
Needs (1980)	23	NA*
Early Action Plan (to 1980)		
Chimney Bluffs State Park	5.6	NA
Como Reservoir (450-2)	9.3	470
Sixmile Creek Watershed Project	NA	NA
Limestone Reservoir (71-13)	10.7	NA
Oneida Lake Beach Development Pilot Project	0	NA
Expansion of 7 State and County Parks	26.4	NA
Needs (1980-2020)	100	NA
Alternative (1980-2020)		
Butternut Reservoir (71-12)	10.7	NA
Major Reservoirs (3)**	NA	NA
Major Reservoirs (2)	16	NA
Barge Canal Recreation Sites (5)	28	NA
Inland Lake Recreation Sites (4)	35.6	NA
Harbors of Refuge on Lake Ontario	NA	NA
River Valley Acquisition and Development (100 miles)	NA	8,600
Access Sites	NA	NA
Private Development	NA	NA

*Not Available
**Number of Areas

Reference: Oswego River Basin Comprehensive Water Resources Plan, October 1971 (Draft)

picnicking, swimming, and nature and bicycle trails.

All existing publicly owned land should be developed more intensively to provide additional recreational areas of the Class II type. Since the level of development on some of these lands is quite low, additional development can be provided easily without producing overdevelopment. Some of these lands can accommodate facilities for recreational activities not now provided.

The following specific elements should be given priority for acquisition and development during the 1970–1980 time period:

(1) three new parks—2,000 acres each
(2) expansion of seven existing county and State parks
(3) twenty miles of river valley—6,400 acres
(4) additional recreational facilities on State forest lands
(5) recreational facilities on State game lands, particularly hunter and sightseer access

These elements should be given priority for acquisition and development, 1980–2000:

(1) additional recreational facilities on State forest and game lands
(2) three new parks—2,000 acres each
(3) thirty miles of river valley—9,600 acres

These items should be given priority during the 2000–2020 period:

(1) three new parks—2,000 acres each
(2) thirty miles of river valley—9,600 acres

The following elements should be given priority for acquisition and/or development during the entire time segment:

TABLE 21–40 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 5.2

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	180	80	100	260	80	180	400	80	320	570	80	490
Picnicking	1,000	1,400	0	1,230	1,400	0	1,680	1,400	280	2,270	1,400	870
Camping	580	1,300	0	910	1,300	0	1,490	1,300	190	2,310	1,300	1,010
Parking (General)	370	220	150	500	220	280	810	220	590	1,050	220	830
Parking (Boats & Water-Skiing)	270	30	240	400	30	370	640	30	610	970	30	940
Subtotal	2,400	3,030	490	3,300	3,030	830	5,020	3,030	1,990	7,170	3,030	4,140
Acres of Developed Land for Other Summer Activities												
Playfields	3,170	720	2,450	4,650	720	3,930	7,710	720	6,990	11,400	720	10,680
Golf	5,020	4,200	820	7,300	4,200	3,100	12,440	4,200	8,240	18,160	4,200	13,960
Subtotal	8,190	4,920	3,270	11,950	4,920	7,030	20,150	4,920	15,230	29,560	4,920	24,640
Acres of Developed Land for Winter Activities												
Snow Skiing	450	0	450	480	0	480	600	0	600	750	0	750
Sledding	560	0	560	710	0	710	1,130	0	1,130	1,760	0	1,760
Ice Skating	40	0	40	70	0	70	110	0	110	160	0	160
Subtotal	1,050	0	1,050	1,260	0	1,260	1,840	0	1,840	2,670	0	2,670
Total Acres of Developed Land	11,640	7,950	4,810	16,510	7,950	9,120	27,010	7,950	19,060	39,400	7,950	31,450
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	64,000	221,000	0	102,000	221,000	0	160,000	221,000	0	249,000	221,000	28,000
Miles of Trails												
Hiking & Nature Walks	290	10	280	400	10	390	620	10	610	890	10	880
Bicycling	480	0	480	570	0	570	760	0	760	1,040	0	1,040
Horseback Riding	120	10	110	150	10	140	220	10	210	310	10	300
Total Miles of Trail	890	20	870	1,120	20	1,100	1,600	20	1,580	2,240	20	2,220
Total Needs for New Lands for Recreation (Acres)												
Class I			4,100			8,400			17,800			28,800
Class II			12,000			14,100			25,300			47,700
Total Land Needs			16,100			22,500			43,100			76,500
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			3,300			4,900			11,600			24,200
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	37,177			50,075			75,006			106,907		
For water-oriented recreation activities (1000s)	9,580			13,255			19,984			28,731		

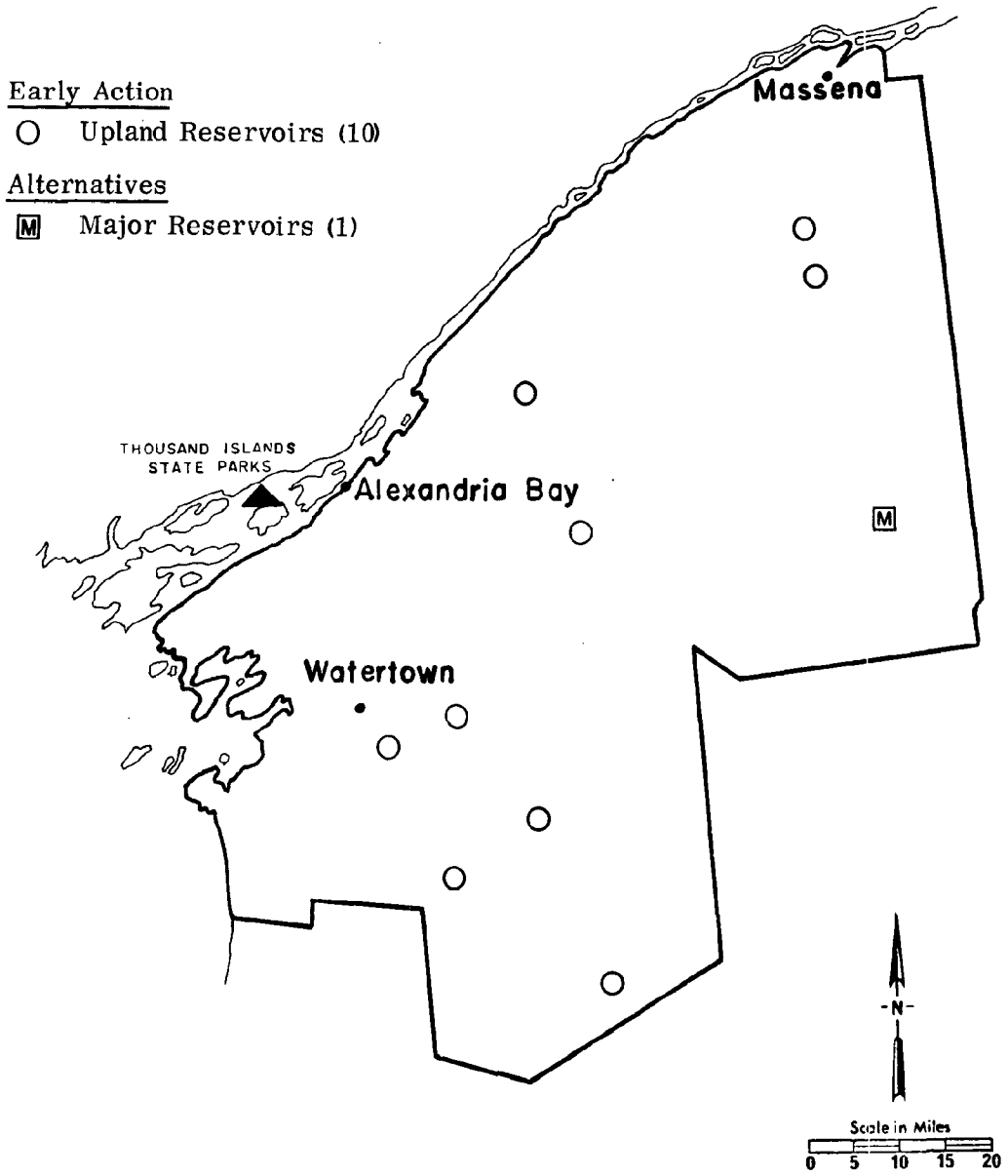


FIGURE 21–85 Reference Map for Planning Subarea 5.3

(1) additional harbors of refuge on Lake Ontario

(2) additional public access sites on those lakes and streams with unused capacity

4.6.15 Planning Subarea 5.3

Planning Subarea 5.3 is a three-county area in northern New York State. Located on the eastern side of Lake Ontario, it contains much of the watershed for the upper St. Lawrence River (Figure 21–85). Like the other Lake Ontario planning subareas, Planning Subarea 5.3 is characterized by a lake plain in the western portion and a broad, rolling plateau in the eastern part. Areas of recreational interest include the famous Thousand Islands, Bridge Caverns, numerous State parks, and inland lakes with beautiful sand beaches.

Much of the area is forest-covered and possesses a rural character. There are no SMSAs within its boundary, and the largest centers of population include Watertown (33,000), Ogdensburg (16,000), Massena (15,000), and Potsdam (8,000). Only 54 percent of the planning subarea's effective population was derived from SMSAs lying outside the area.

The gross land area available for recreation in this planning subarea is 211,000 acres. Most of this acreage is in State forests. Total water area supply available for recreation amounts to approximately 109,000 acres, of which 77,000 acres are on the Great Lakes and 32,000 acres on inland waters.

The total 1970 recreational requirements exceeded 8.6 million recreation days. By 2020, total requirements are expected to reach 24.7 million recreation days. Water-oriented recreational requirements in 1970 were more than 2.0 million recreation days and are estimated to reach 6.2 million by 2020.

4.6.15.1 Estimate of Needs

(1) Urban Land Needs

Slightly more than half of the total developed acreage needs are allocated as urban or Class I land needs. The greatest developed acreage facility need is for playfields. A modest need for golf courses existed in 1970 and is expected to continue to 2020. The total needs for Class I recreational land were 2,300 acres in 1970; by 2020 this need will increase to nearly 10,000 acres.

(2) Nonurban Land Needs

The need for swimming beaches was expected to increase from 50 acres in 1970 to 130 acres by 2020. Table 21–42 shows a continuing need for trail developments to accommodate hikers, bicyclists, and horseback riders. The present supply of camping and picnicking appears adequate. By 2000, however, approximately 110 acres of developed land will be required for picnicking, and the need is expected to reach 440 acres by 2020. It should once again be stressed that the methodology used here did not account for travel patterns and, therefore, estimated needs in Table 21–42 may be short of the actual numbers. In comparison, the New York Statewide Comprehensive Outdoor Recreation Plan of 1966[32] showed a definite need and proposed additional development for both picnicking and camping facilities. The plan set forth a program to double the number of campsites in State parks in the three counties within this planning subarea. It also proposed to increase the number of picnic facilities by approximately 25 percent. Total needs for Class II recreation lands were 3,100 acres in 1970, expected to increase to 11,600 acres by 2020.

(3) Total Land Needed for Recreation

Land needed to meet the recreational requirements is expected to grow from almost 5,400 acres in 1970 to nearly 22,000 acres by 2020.

4.6.15.2 Problems

In addition to the general problems discussed in Subsection 4.5, there are two other problems applicable to this area.

The eastern Lake Ontario shoreline has very limited quantities of natural beach for development. The inventory for the International Joint Commission study[16] disclosed only 12 acres of beach on Lake Ontario in this planning subarea, all of it in public ownership. However, some additional acres of beach are contained in State parks on the Thousand Islands and along the St. Lawrence River.

This area, together with adjacent areas to the east, receives heavy use from the Albany, Schenectady, and Utica areas, especially on weekends and vacation. Furthermore, the extension of I–87 (northward from the New York State Thruway at Albany) and I–80 from Syracuse opened the Adirondack area to people from New York City, Canada, and central New York State. It is anticipated that the intensity of use in this general area will increase steadily in the future, but will be controlled by land-use restrictions within the Adirondack Park boundaries.

4.6.15.3 Suggestions for Future Action

Largest acreage with potential for recreational development is found in the several forestation areas. More than 153,000 acres of these virtually undeveloped lands are available for recreational use. Similarly, several public parks contain sufficient buffer lands for increased development which would not seriously damage the aesthetic qualities of the area.

Some additional lands should also be acquired and developed to meet the increasing need for recreational opportunities in this planning subarea. Where they are suitable for recreational use, flood plains and adjacent lands should be acquired and developed, especially near urban areas. These can provide a full range of day-use and many weekend-use activities.

Once land acquisition has been completed, the development of single- or multi-purpose reservoirs can become another program. While the "forever wild" provision of the State Constitution constrains reservoir develop-

TABLE 21-41 Potential Recreation Measures, Planning Subarea 5.3

Measures	Est. Recreation Days Capacity (1000s) Daily	Annual
Needs (to 1980)	NA*	NA
Early Action Plan (to 1980)		
State Parks (2)**	NA	1,364
River Valley Acquisition and Development (10 miles)	NA	860
Canoe Routes (8)--150 miles	NA	NA
Preservation of Scenic and Recreational Areas	NA	NA
Existing Lake Recreation Facilities (3)	NA	NA
Upland Multipurpose Reservoirs (4)	NA	NA
Upland Multipurpose Reservoirs (3)	NA	407
Upland Recreation Reservoirs (4)	NA	NA
Upland Recreation Reservoirs (3)	NA	180
System of Scenic, Wild, and Recreational Rivers & Lakes	NA	NA
Major Multipurpose Reservoir (1)	NA	NA
Needs (1980-2020)	NA	NA
Alternatives (1980-2020)		
State Parks (5)	NA	3,410
Expansion of Existing Facilities	NA	NA
Access Sites	NA	NA
Major Multipurpose Reservoirs (2)	NA	498

*Not Available
**Number of Areas

Reference: Black and St. Lawrence River Basin Comprehensive Water Resources Plans (Being drafted)

ment in the Adirondack Park, some sites such as Forestpark, McKeever, and Jordan are good potential sites.

The numerous lakes in this planning subarea should be examined for their potential as scenic lakes. Those that qualify should be protected and maintained in their natural state. Where additional development is feasible on lakes not qualifying as scenic lakes, that potential should be expanded to its optimal level.

Other recreational opportunities can be provided by acquisition and development of access sites on streams and Lake Ontario where present development is inadequate. Additional harbors of refuge and marinas should be considered for the Lake Ontario shore. Table 21-41 summarizes the alternatives considered by the State of New York.

The 1966 New York Statewide Comprehensive Outdoor Recreation Plan[32] indicates programmed development of the following within this planning subarea:

(1) several State parks, concentrated along Lake Ontario and the St. Lawrence River valley
(2) a number of State campsites
(3) several boat launching sites
(4) two harbors of refuge
(5) acquisition and preservation of wetland areas

If encouraged, the private sector can help meet the needs of this planning subarea. It can certainly provide quality development for certain activities such as camping, golfing, and boat launching.

4.6.15.4 Plan Design

For all Class I recreational developments, new lands will have to be acquired in and near urban areas throughout the planning subarea. The New York State Plan[32] lists major urban recreational programs within Watertown, Alexandria Bay, and Massena.

In the City of Watertown, priority projects in the 1965–71 program included the development of indoor ice and roller skating rinks, a multi-purpose building, and an indoor Olympic-size swimming pool. The city plans to acquire flood plain land for conservation.

The Village of Alexandria Bay, located on the St. Lawrence River, owns a 200-acre golf course, one community park, and seven smaller areas. A large number of tourists are attracted to the village and make extensive use of its recreation facilities. Increased demand is developing for swimming, ice skating, picnicking, and existing boating is apparent. The village plans to develop and expand its existing waterfront park.

The Village of Massena is developing an existing site as a regional park.

A large part of the needs for Class II recreational development can be satisfied with new facilities on existing publicly owned lands. It is assumed that 50 percent of needs for Class II recreation areas could be satisfied on recreational development of State forest lands and more intensive development of existing State parks. Additional land will not have to be acquired to meet the need for trails, as such developments could take place on buffer lands now in public ownership.

Some additional needs will be satisfied by development of recreational facilities on private land. The Niagara-Mohawk Power Corporation has a plan of recreational development on a number of its impoundments in this planning subarea. While these proposed facilities are somewhat limited in scope, they will provide additional opportunities for boating, fishing, camping, and picnicking. In addition to the above, the following elements should be given priority for acquisition and development in the 1970–1980 time frame:

(1) two new parks—2,000 acres each
(2) ten miles of river valley—3,200 acres
(3) six reservoirs with recreational facilities

These should be given priority in the 1980–2000 time frame:

(1) two new parks—2,000 acres each
(2) additional recreational facilities on State forest and game lands

The following should be given priority for acquisition and development during 2000–2020:

(1) three new parks—2,000 acres each
(2) one large reservoir
(3) continued development on State forest and game lands

These items should be given priority during the entire period:

(1) acquisition and development of access sites on lakes and streams where additional recreational potential is present
(2) one large reservoir
(3) provision of additional harbors of refuge as needed

TABLE 21-42 Outdoor Recreation Requirements, Supply, and Needs by Activity, PSA 5.3

Activity	1970 Reqmnt	1970 Supply	1970 Needs	1980 Reqmnt	1980 Supply	1980 Needs	2000 Reqmnt	2000 Supply	2000 Needs	2020 Reqmnt	2020 Supply	2020 Needs
Acres of Developed Land for Water-Oriented Activities												
Swimming	40	10	30	60	10	50	100	10	90	140	10	130
Picnicking	600	890	0	750	890	0	1,000	890	110	1,330	890	440
Camping	230	1,300	0	360	1,300	0	570	1,300	0	870	1,300	0
Parking (General)	90	40	50	120	40	80	180	40	140	220	40	180
Parking (Boats & Water-Skiing)	110	10	100	150	10	140	240	10	230	350	10	340
Subtotal	1,070	2,250	180	1,440	2,250	270	2,090	2,250	570	2,910	2,250	1,090
Acres of Developed Land for Other Summer Activities												
Playfields	1,550	80	1,470	2,250	80	2,170	3,680	80	3,600	5,350	80	5,270
Golf	1,240	570	670	1,780	570	1,210	2,980	570	2,410	4,280	570	3,710
Subtotal	2,790	650	2,140	4,030	650	3,380	6,660	650	6,010	9,630	650	8,980
Acres of Developed Land for Winter Activities												
Snow Skiing	110	0	110	120	0	120	150	0	150	180	0	180
Sledding	140	0	140	170	0	170	270	0	270	410	0	410
Ice Skating	10	0	10	20	0	20	30	0	30	40	0	40
Subtotal	260	0	260	310	0	310	450	0	450	630	0	630
Total Acres of Developed Land	4,120	2,900	2,580	5,780	2,900	3,960	9,200	2,900	7,030	13,170	2,900	10,700
Acres of Water Surface												
Boating (including canoeing, sailing & water-skiing)	34,000	109,000	0	49,000	109,000	0	78,000	109,000	0	116,000	109,000	7,000
Miles of Trails												
Hiking & Nature Walks	130	0	130	190	0	190	290	0	290	410	0	410
Bicycling	120	0	120	140	0	140	190	0	190	250	0	250
Horseback Riding	30	0	30	40	0	40	50	0	50	70	0	70
Total Miles of Trail	280	0	280	370	0	370	530	0	530	730	0	730
Total Needs for New Lands for Recreation (Acres)												
Class I			2,300			3,700			6,500			9,900
Class II			3,100			4,500			7,500			11,600
Total Land Needs			5,400			8,200			14,000			21,500
Total Needs for New Lands for Water-Oriented Recreation (Acres)												
Total Water-Oriented Land Needs			600			900			1,900			3,700
Annual Requirements in Recreation Days												
For all recreation activities (1000s)	8,672			11,656			17,465			24,654		
For water-oriented recreation activities (1000s)	2,087			2,867			4,193			6,237		

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Section 5

EVALUATION

In this section the proposed regional plan is weighed against total needs to determine its effectiveness. Land acquisition and facility development costs necessary for plan implementation are also estimated.

5.1 Effectiveness of the Plan

To evaluate the ability of various types of resource areas within the Region to provide recreational opportunities for the six water-oriented activities (beach swimming, picnicking, camping, sightseeing, hiking, and nature study) used in this evaluation, models were developed to represent the major types of resource base. Since two sets of standards for development were used in this study to calculate requirements and needs for acres of land—one each for the northern and southern parts of the Region—these same standards were used in the model system. Three models were devised for the southern part of the Region and four were developed for the northern part. In the southern part of the Region, models were constructed for recreational areas centered on lakeshores, flood plains, and general recreational resource areas. These same three resource types plus natural areas were used for the northern part of the Region. Details of the models are in Annex G.

In each of the models, a given level of development and mix of recreational activities were assumed for a given area with that type of resource base. Visitation in recreation days provided per 1000 acres of such a base was calculated from these assumptions. The annual visitation rates per type of resource base were then used to evaluate the capacity of the many resource units incorporated into the suggested recreational plan of each planning subarea. In some instances certain resource elements did not fit too well into any one particular model, but an effort was made to fit each resource base unit into that model which seemed most appropriate. The regional plan consists of the sum of the 15 plans for each of the planning subareas.

In the Great Lakes Region in 1970 the existing recreational facilities for the six water-oriented recreational activities were capable of approximately 94 million recreation days, or 64 percent of the total 1970 requirement for these activities.

Additional development programmed for completion before 1980 will increase the capacity of recreational facilities for these six activities to 100 million recreation days. The proposed regional recreation plan would provide an additional 60 million recreation days in the six water-oriented activities by 1980, and additional increments of 80 million days of opportunities between 1980 and 2000, and 75 million between 2000 and 2020. Thus, the total capacity of recreational facilities for these six water-oriented activities will have been increased to 160 million recreation days by 1980, 240 million recreation days by 2000, and nearly 315 million by 2020.

The proposed level of public development, together with existing and programmed supply, will satisfy 80 percent of projected requirements in 1980 and 2000, and 74 percent in 2020.

Level of development varies from one planning subarea to another. In heavily populated areas substantial residual need remains, while in some more sparsely populated ones development was programmed to provide some surpluses of facilities. The recreation plan was developed in this manner to accommodate the large numbers of people from large urban areas who seek recreational opportunities in the northern or eastern parts of the Region. Since the methodology did not adequately consider the problem of travel patterns, an attempt was made in plan formulation to give some additional consideration to export of requirement from one planning subarea to another.

A substantial amount of residual need would still remain if the elements of the proposed regional plan were developed according to schedule. In 1970 there were 52 million recreation days of residual need. It is projected that this would decrease to 40 million rec-

reation days in 1980, but would increase again to nearly 57 million recreation days by 2000 and 114 million in 2020.

The actual amount of facilities that can be provided by the private sector depends upon the state of the economy, the profit potential of various developments, and government incentive programs. However, recent studies completed by the State of Minnesota show that approximately one-third of the State's developed recreational facilities on an acreage basis are provided by the private sector. For this reason, it is believed that the private sector can meet all of this plan's residual needs. If the private sector should show the ability to satisfy more than the residual needs, the amount of facilities provided by the public sector could be reduced accordingly.

5.2 Cost of Acquisition and Development

In this section an attempt is made to develop a general cost figure for acquisition and development of recreational lands and facilities. Since it was not possible to have knowledge about all land areas that might be acquired and developed over such a broad area over a period of 50 years, the models developed to calculate the amount of visitation for each element in the regional plan were used to calculate the cost of facilities. Costs of providing the water-oriented recreational facilities used in each of the seven models were developed and converted to a facility-cost per thousand acres of land for that specific type of resource base. See Annex H, Calculation of Facility Costs, for the details of this analysis. The land acreage of each element included in the regional plan was then multiplied by the facility-cost per thousand acres for that type of resource base to obtain facility costs for that plan element. These costs were then increased by 15 percent to cover contingency costs of planning and construction supervision (Table 21–43).

Samples of current land costs were obtained from several States for various types of resource bases. These were expanded into the remaining States. Land costs were calculated from these data. Costs include the estimated costs of acquisition for the five newly-authorized national park and national lakeshore areas in Minnesota, Wisconsin, and Michigan. Cost data on these recreational areas were obtained from the legislation authorizing their establishment. They total 264,000 acres of land and are included in the 1970–1980 time frame. Approximately 70,000 acres of natural areas were also proposed to be acquired in Planning Subareas 1.1, 1.2, and 2.1.

TABLE 21–43 Estimated Facility and Contingency Costs by Time Frame (in millions of dollars)

Time Period	Estimated Facility Cost	Contingencies	Total Costs
1970–1980	297	35	332
1980–2000	401	50	451
2000–2020	366	47	413
Total	1,064	132	1,196

It was estimated that 686,000 acres of land will be needed by 2020 to accommodate the proposed scale of recreation development, not including 264,000 acres recently authorized for acquisition as national park or lakeshore areas. The acquisition program was projected as follows: 159,000 acres by 1980, 211,000 acres between 1980 and 2000, and 215,000 acres between 2000 and 2020. See Table 21–44 for a breakdown of estimated land costs.

The total estimated cost of recreation facilities and land to accommodate the program of development set forth in the plan section is presented in Table 21–45.

Annex I, Supplementary Statistical Tables, gives land, facility, and contingency costs for the years 1980–2020 by planning subarea.

Operation and maintenance costs were estimated to be twenty-five cents ($0.25) per recreation day. Based on this figure, costs for the new facilities proposed in the regional plan were estimated to average $15 million per year by 1980, approximately $35 million per year by 2000, and $54 million per year by 2020 on a cumulative basis.

Replacement costs were based on an average life of 25 years for the major components of recreational facilities, amounting to four percent of facility costs per year. On this basis, these costs were estimated to average $15 million per year by 1980, $34 million per year by 2000, and $53 million per year by 2020 on a cumulative basis.

5.3 Allocation of Facility and Land Costs

There is little information on which to base allocation of costs to Federal and non-Federal interests. Federal participation in the funding of recreational facility development has changed so rapidly that it provides little basis for future projections.

TABLE 21–44 Estimated Land Needs and Costs

Time Period	Acres of Land in thousands*	Cost of Land in millions
1970–1980	423*	385
1980–2000	211	397
2000–2020	215	312
Total	849*	1,094

*This includes the 294,000 acres of land recently authorized for acquisition as national park or lakeshore areas in the Great Lakes Region.

TABLE 21–45 Summary of Land and Facility Costs (in millions of dollars)

Time Period	Land Costs	Facility Costs	Total Costs
1970–1980	385	332	717
1980–2000	397	451	848
2000–2020	312	413	725
Total	1,094	1,196	2,290

TABLE 21–46 Allocation of Costs (in millions of dollars)

Element	Total	Federal	Non-Federal
Land	1,340	470	870
Facilities	1,331	466	865
Total	2,671	936	1,735

Through 1965, expenditures for water-oriented, land-based recreation in the Great Lakes Region were limited largely to the Boundary Waters Canoe Area and the Isle Royale National Park. In 1965, establishment of the Land and Water Conservation Fund authorized the Federal government to assist States in acquisition and development of recreation lands on a cost-sharing basis. This fund tripled between fiscal 1970 and 1971.

Because of these changes, the allocation of Federal participation was made strictly arbitrary. This study assumed that the Federal government will contribute 35 percent of total costs and non-Federal interests will supply the remainder. Table 21–46 shows the result of this allocation.

Section 6

RECOMMENDATIONS

6.1 Water-Oriented Recommendations

(1) Those segments of the shores of the Great Lakes having significant recreational potential, especially those near urban areas, should be acquired and managed in a manner compatible with the resource and recreational needs (Subsection 4.6).

(2) A program to identify, preserve and manage free-flowing streams should be continued by Federal, State and local governments. A similar program should be established to identify, preserve and manage natural lakes. Such rivers and lakes should be studied in detail to determine their optimal capacity for meeting recreational needs. In 1970, there was only one river, the Wolf in Wisconsin, designated as part of the National Wild and Scenic Rivers System. Michigan's Pere Marquette has been recommended for inclusion in the Federal system. Four other rivers in the Region must be evaluated as part of any Federal planning involving the use of water and related land resources in the river areas (Subsections 4.3 and 4.3.5).

(3) Public access sites should be selected and acquired on all streams and lakes determined to have recreational potential in number 2 above (Subsections 4.3.2 and 4.3.5).

(4) Islands within the Great Lakes should be studied to determine their recreational potential. Consideration should be given to acquisition, preservation, and developmental alternatives for those islands possessing scenic, historic, cultural, scientific, or aesthetic value (Subsection 4.4.2).

(5) Flood plains, especially near urban areas, should be used to their highest potential to provide recreational opportunities (Subsection 4.4.3). All States in the Great Lakes Region should enact legislation similar to Wisconsin's Water Resources Act of 1965 to provide for zoning of shorelands on navigable waters as in Section 22 and for zoning of flood plains as in Section 31 (Subsections 4.4.3 and 4.5.5.5).

(6) Legislation should be enacted to provide the public free and unrestricted rights to use the beaches of the Great Lakes in all areas where public health or national defense would not be placed in jeopardy (Subsection 4.4.1).

(7) Facilities for such activities as camping, picnicking, hiking, nature study, and sightseeing compatible with the basic purposes of public hunting areas and wildlife refuge areas should be provided in such areas (Subsection 4.4.5).

(8) Water quality standards should be extended and enforced on both inter- and intrastate waters to improve recreational opportunities. These waters should support limited body contact activities at least, and total body contact activities where possible. Direct measures to prevent and abate water pollution at its source should be stressed (Subsections 4.5.5.1, 4.5.5.2, 4.5.5.3, and 4.5.5.4).

(9) Methods of reducing sedimentation, a major source of water pollution, from agricultural operations, highway construction, and other land-use operations, are well established, and progress in land management should continue. The application of watershed management and soil conservation practices should be intensified to reduce erosion and to increase the recreational potential of the water resources in the Region (Subsection 4.5.5.2).

(10) Methods should be explored to lessen the impact of adverse weather and water conditions on recreational activities along the Great Lakes shores (Subsection 2.3.1.1).

(11) The beaches of the Great Lakes should be included in the Congressional Bill entitled "Open Beaches Act of 1969" which affirms that the ocean beaches of the United States are of national interest and that the public shall have full and unrestricted right to use them (Subsection 4.4.1).

(12) Where impoundments can serve the best interests of the general public, Federal construction agencies should be permitted to build them with more than 50 percent of the costs attributed to recreational purposes. In or near metropolitan areas they should be authorized to construct single-purpose recreation and fish and wildlife reservoirs (Subsections 4.3.4 and 4.5.2.5).

(13) Because of sizeable water-oriented

recreation needs and limited available resources, Level B studies should be carried out in Planning Subareas 2.3, 3.2, and 4.3 (Subsection 4.6).

(14) Where it is practical, existing public waters should be managed through space and time zoning, reservation of space, or other practices to obtain the maximum recreational utility compatible with optimal potential of such waters (Subsection 4.5.2.7).

6.2 General Recommendations

(1) Emphasis should be placed on providing sufficient recreational opportunities for urban residents, where the most serious imbalances between supply and requirements are found. City and regional parks with the capacity to accommodate large numbers of people and readily accessible to urban residents will accommodate much of the heavy use generated by the large centers of population. City parks should be located within walking distance of the user (Subsections 4.5.2.3 and 4.5.2.4).

(2) Planning, acquisition, and development programs to increase outdoor recreational opportunities for all of the Region's residents should be accelerated by public agencies (Subsection 4.5.3).

(3) To satisfy the massive requirements emanating from urban areas, regional approaches to resource planning should be expanded to integrate and coordinate recreational planning, development, and management among the local governmental entities (Subsection 4.5.7).

(4) Sufficient funds should be made available to public agencies for acceleration of recreational programs that increase outdoor recreational opportunities and developments (Subsection 4.5.3).

(5) National, State, and county parks and forests which are currently underdeveloped or undeveloped for recreation should be protected and managed to realize their optimal potential for meeting part of the Region's recreational needs. Such development must be compatible with the resource base and the primary purpose of the park or forest (Subsections 4.4.6, 4.4.7, and 4.6).

(6) The optimal carrying capacity of recreational areas and related access sites should be determined, and they should be managed so as not to exceed that level over long periods of time.

(7) Emphasis should be placed on land-use controls to supplement fee simple acquisition, particularly on lands designated as buffer zones and intended for low intensity use. Flood plain and lakeshore zoning, deed restrictions, public use liability laws, life tenancies, leases, access easements, and other land-use controls should be used in expanding the recreational resource base of the Region (Subsections 4.5.2.7 and 4.5.3.1).

(8) Areas and facilities should be developed and managed for off-road vehicles. Such designated areas should be provided with adequate erosion control measures to prevent water quality problems from developing (Subsection 4.5.4.3). Indiscriminate use of such vehicles in nondesignated areas should be controlled.

(9) Those proposed and potential areas possessing outstanding scenic, historic, and scientific values should be preserved in a national system. Similar areas not qualifying for the national system should be preserved by State and local interests (Subsection 4.4.9).

(10) Trails systems at the Federal, State, and local levels should be expanded to provide additional recreational opportunities (Subsection 4.4.8).

(11) The private sector should be encouraged and aided to meet a substantial part of the total recreational needs in the Region. Properly planned incentive programs would be a catalyst toward the expansion of private development compatible with resource capacity (Subsection 4.5.2.6).

(12) Significant areas of sand dunes along the Great Lakes shores and other areas where they play a vital role in the overall environment should be protected from indiscriminate use of off-road vehicles, mining, and other activities which damage or destroy their extremely fragile ecology. Such protection should be accomplished through a combination of fee acquisitions, easements, and zoning (Subsections 4.5.4.3 and 4.6.6.3).

(13) Both public and private forest lands should be given greater protection from detrimental factors. Greater emphasis should be given to the protection and improvement of private lands through multiple-use management that will enhance outdoor recreational opportunities and developments (Subsection 4.4.6).

(14) The impact of all new recreational developments on the environment should be assessed and properly considered prior to such development (Subsection 4.5.2).

(15) Basic and applied research should be encouraged to provide much-needed base data

on the many aspects of recreational use, user motivation, and resource management. Origin and destination studies, user preferences, economic studies, resource carrying capacities, and tourism studies warrant consideration (Subsections 1.2 and 2.2).

SUMMARY

Population

In 1970 the Great Lakes regional population totaled 29,000,000. Almost one-half of this population resided in Planning Subareas 2.2 (Chicago-Milwaukee area) and 4.1 (Detroit area). Approximately 83 percent, or 24 million people, resided in SMSAs. The 1970 effective population for the Great Lakes study area amounted to nearly 23 million people, 76 percent of whom resided in SMSAs. Regional population is expected to increase 84 percent by 2020, to 53,496,000. Effective population is projected to reach 41 million people by 2020.

Recreation Requirements

Recreational requirements for the Great Lakes Region reached 637 million recreation days by 1970. General land-based activities, including golfing, bicycling, horseback riding, and playing outdoor games accounted for more than 208 million recreation days. Passive activities such as pleasure driving and walking, and attending outdoor games and concerts accounted for almost 208 million recreation days.

Land-based water-oriented activities, including swimming, picnicking, camping, nature walks, hiking, and sightseeing accounted for almost 170 million recreation days. Water surface and winter sports requirements were only eight percent of total regional demand: 28.5 million recreation days were estimated to have originated from boating, water-skiing, canoeing, and sailing and 22.8 million for snow skiing, sledding, and ice skating.

Recreation requirements are expected to increase much faster than population. While population is expected to increase 84 percent between 1970 and 2020, recreational requirements are expected to increase 193 percent in that period. By 2020, total annual recreational requirements are expected to be almost 1.9 billion recreation days.

The greatest influences on such increases are thought to be decreases in average work week, increases in paid vacations and holidays, and increases in national income and mobility. The greatest proportionate increase is expected to occur in Planning Subarea 4.1 (210 percent), and the smallest in Planning Subarea 1.2 (119 percent).

Recreation Needs

Gross acreage available for public recreation in 1970 amounted to 17.8 million acres. This included approximately 13.5 million acres of land, 2.6 million acres of Great Lakes water surface, and 1.7 million acres of inland lakes water surface.

Based on 1970 supply data, 35 percent of total 1970 recreational requirements were estimated to be unsatisfied. This unsatisfied portion is expected to increase to 45 percent in 1980, 62 percent in 2000, and 72 percent by 2020, when requirements for each target year are compared with 1980 supply data.

Water surface acreage for recreation is expected to yield a surplus until 2000. At this time there will be a need for 354,700 acres. This is expected to increase to 2,179,000 acres by 2020. Needs are evident for 1970 and 1980, however, near the Region's largest urban centers—Milwaukee, Chicago, Detroit, Toledo, Cleveland, and Rochester. If constructed, public or private reservoirs could satisfy a considerable part of this need, especially when located near urban areas. The 1970 supply could satisfy 81 percent of the 1970 land-based water-oriented requirements and only 47 percent of requirements for other land-based activities. By 2020 existing and programmed supply will satisfy only 28 percent of land-based water-oriented requirements and only 12 percent of other land-based requirements.

Tourism exerts considerable influence on the Region's economy with expenditures in the hundreds of millions of dollars annually. The two most popular tourist destination areas in the Region are the Lake Superior, northern Lake Michigan, and northern Lake Huron area; and the Lake Ontario area. These areas need continued upgrading to compete

with other major tourist areas and to stimulate local economics.

Level B studies should be conducted in Planning Subareas 3.2, 4.3, and parts of 2.3 to examine recreational problems and needs more precisely in these areas. There is need for more research to determine where people go to recreate. No tools were available in this study to measure the directional pattern of recreational travel within the Great Lakes Region.

Recreation Resources

Recreational resources within the Great Lakes Region include many areas with exceptional scenic, natural, wilderness, and aesthetic qualities which make them nationally significant. There is considerable potential for additional hiking, nature study, bicycling, and horseback riding trails.

In 1970, there were 1,378,000 acres in national park and wilderness areas and more than 540,000 acres of State and local parks. Only a small percentage of the 36.9 million acres of forest land in the Region was developed for recreational use. It is estimated that 40,000 acres of Federal forest land, 17,500 acres of State forest land, and 5,600 acres of locally owned public forest land could be developed for intensive recreational use.

More than 67 million acres, or 80 percent of land in the Region, were privately owned in 1970. Approximately 1,000,000 acres were considered to have potential as recreational resources.

Of the Region's 5,500 acres of Great Lakes beaches, approximately 2,300 acres, or 41 percent, are open to the public. Another 1,600 acres, or 29 percent, have recreational potential but are not public. The remainder have little or no recreational potential. Several islands in the Great Lakes also have potential, although the extent is not known.

Numerous inland lakes within the Region have considerable recreational potential. However, acquisition and development of land on their shores will be expensive and controversial because of competing land uses.

Wild and scenic rivers systems have been established at the Federal and State levels. All or segments of the Pine, Popple, and Pike in Wisconsin and the Sandusky in Ohio have already been designated as State rivers. In addition, Minnesota, Wisconsin, Michigan, and New York have designated several streams within the Region as canoe trails.

Much of the 825,000 acres of flood plains located in rural areas and 120,000 acres of flood plains in urban areas is still available or adaptable for the development of a full range of recreational opportunities and open space.

Problems

Major problems of recreational management, development, and employment in the Region include land-use competition, high cost of land acquisition and development, urban blight, shoreland erosion, water pollution, misuse of resources, restricted access, incompatible activities, and maintenance costs.

Shoreland development has severely impaired many miles of Great Lakes shorelands, inland beaches, and river banks for recreational use. Residences and industry have dumped wastes into these waters to such an extent that many beaches, especially near urban areas, have become unsafe for swimming. Use and enjoyment of approximately five million acres of Great Lakes waters lying within two miles of shore is hindered by occasional adverse weather conditions, impaired water quality, and a shortage of boat harbors and marinas.

There is a great disparity within the Region between the location of recreational resources and large centers of population. A large percentage of the recreational land is located in the north, inaccessible for day and weekend use by the majority of the population. Many of the recreational resources in the southern part of the Region and a few in the north are being used to capacity, while inaccessible or less prominent resources receive little use. To satisfy a large portion of the Region's recreational needs, opportunities should be within a one-hour drive for day use and within a three-hour drive for weekend use. Northern portions will continue to experience great utilization of facilities by the vacation sector, while southern portions will have greater utilization by day and weekend users.

Within the cities are large concentrations of the poor, the old, the less mobile, and the racial minorities whose needs for meaningful social, cultural, and recreational activities must be met with Federal, State, and local funding with adequate allocation of recreational resources, and with neighborhood involvement. Many of the existing urban recreational facilities and programs are inadequate to accommodate the needs of the urban resident. The present park and recreational programs

close to his home or accessible by public transportation are limited.

Desires and use patterns of recreationists are changing with the passage of time. When management does not foresee these changes in time, many problems arise. For example, indiscriminate use of snowmobiles, dune buggies, all-terrain vehicles, and off-road vehicles is creating conflicts with other participants in the more traditional activities. Such use of vehicles may also destroy vegetative cover and damage soils.

GLOSSARY

acquisition by fee—acquisition of all purchasable rights in real estate.

activity occasion—participation of an individual in a specific outdoor recreation activity during any part of a 24-hour period. Activity day is an interchangeable term with the same meaning. A recreation day equals 2.5 activity days. A person may participate in more than one activity in any given calendar day.

attending outdoor sports events—the attendance at any outdoor sports event as a spectator rather than as a participant or an official.

attending outdoor concerts or plays—the attendance at musical, dramatic, artistic, or other nonsporting events which are carried on out-of-doors, but excluding drive-in movies.

beach—a nearly level stretch of sand, shingle, or mud devoid of woody vegetation and adjacent to a body of water. The beaches of inland lakes are weakly developed in comparison with those of the oceans and the Great Lakes.

benefits—the tangible and intangible advantages of a land or water development project, such as the diversion of water or the building of a dam, that accrue to society.

bicycling—bicycle riding for pleasure. This excludes cycling to or from work or school.

biotic areas—those areas having ecological significance.

boat basin—a protected anchorage for small craft with facilities for launching and loading. The basin may be excavated from shoreland or created by a breakwater.

boating—the use of watercraft including canoes, sailboats, rowboats, rafts, floats, and outboard and inboard motor boats for recreational purposes.

boat ramp—a natural or constructed slope on the shore of a lake where boats can be launched from and loaded on trailers.

camping—a recreation activity in which the participant takes his bedding, cooking equipment, and food and spends at least one night out-of-doors using for shelter a bed roll, sleeping bag, trailer, tent, or a hut open on one or more sides.

carrying capacity (recreational)—the measure of the optimum capacity of a recreational resource to support one or a group of recreational activities over an extended period of time without permanent damage to the resource base.

Class I lands—areas intensively developed and managed for high density recreation use. Historic and cultural sites (Class VI recreation lands) are included within Class I lands in this appendix. In the Basin an average of 50 percent of the lands in this class are developed for recreational use.

Class II lands—general outdoor recreation areas which are subject to substantial development for a wide variety of specific recreation uses. Class IV (Unique Natural Areas) were considered to be Class II lands in the supply analysis of the appendix. In the Basin an average of 10 to 15 percent of these lands were developed for intensive use.

Class III lands—natural environment areas which are suitable for recreation, usually in combination with other uses. Also included in this category in this appendix are lands classified as Class V (Primitive Areas). Little or no development exists on these lands, and use is generally light. Combining Classes VI, IV, and V with Classes I, II, and III, respectively, is not intended to negate in-

herent dissimilarities in the various classes, but rather to recognize, for analytical purposes, similar use patterns for the combined classes in the Basin as well as the same approximate degree of land development.

community beach—a beach dedicated for the semi-exclusive use of a definite subdivision or community. All the property owners in the subdivision or community may use the beach but others are excluded.

cultural landscape—man-made features of a region reflecting land use patterns, population distribution, and other examples of man's activities that have altered the natural landscape.

day-use zone—that area generally within a 50-mile, or a one-hour travel radius of an SMSA.

demand—the amount of goods or services which a given population will utilize over a range of prices.

design load—the optimum number of people that an area or facility can accommodate at any given point in time.

driving for pleasure—both riding and driving for pleasure are included. Activities such as racing are included under Playing Outdoor Games and Sports.

ecology—the science which treats organisms in relation to their environment; frequently subdivided into human ecology, animal ecology, plant ecology, and bio-ecology. The latter deals with the inter-relationships between animal life and plant life.

effective population—the number of people who will seek recreation opportunities within any recreation-market area.

existing supply—the total acreage or capacity of recreation areas that were operational in 1970. Data were derived from the Nationwide Plan Inventory, the Statewide Outdoor Recreation Plans, and the State representatives to the Outdoor Recreation Work Group.

future needs—the projected requirements which will not be satisfied by the projected capability of the present level of development or capability of programmed development.

harbor of refuge—a place of safety for small craft during storm periods, located between commercial harbors on the shores of the Great Lakes.

hiking—destination-oriented walking for recreational purposes, normally involving the carrying of a pack, provisions, and some kind of shelter.

horseback riding—any riding on horseback which is done solely for recreation.

hunting and fishing—for the purposes of this report, hunting and fishing are considered important recreational activities but are not included in recreational needs in this appendix. A detailed discussion including needs is available in Appendixes 8, *Fish*, and 17, *Wildlife*.

ice skating—noncompetitive, recreational skating on ice in the out-of-doors. Thus, ice skating on indoor rinks is not included. Ice hockey, figure skating contests, etc., are considered playing outdoor games or sports.

land-based general activity—a recreational activity that is dependent upon only a land area for fulfillment—outdoor games, golf, bicycling, and horseback riding.

land-based water-oriented activities—recreation activities which normally occur on the land, but are enhanced by water—swimming, picnicking, camping, nature trails, hiking, and sightseeing.

land use—primary use of a tract of land, i.e., agriculture, timber, urban, industrial, and recreation.

marina (lake)—a commercial establishment, located on lakeshores or extending into a lake, for the purpose of servicing and mooring boats. Some marinas have storage for boats and provide hotel accommodations for boat owners.

morainal lakes—glacial lakes in depressions or basins which resulted from the irregular deposition of the drift in terminal and ground moraines.

moraine—an accumulation of glacial drift deposited by the direct action of glacial ice.

multiple-purpose reservoir—a reservoir planned to be used for more than one purpose.

nature walks—a recreational activity that consists of walking for the specific purpose of observing, collecting, photographing, or studying flora, fauna, geological formations, and other natural phenomena.

need—the difference between the recreation requirements for a specified period of time and the existing or programmed supply for that year.

nonconsumptive use—those uses that do not reduce the supply, such as recreational sightseeing, swimming, sailing, and nature study.

nonresident recreation requirement—that portion of a planning subarea's recreation requirement which is generated by people living beyond its boundaries.

nonstructural measures—managing, utilizing, or controlling water and related lands without structural development to achieve a desired objective. Such measures include flood plain zoning, flood warning systems, legal restraints, and preservation measures.

other outdoor recreation activities—activities in which the participant plays a relatively passive role—including driving for pleasure, walking for pleasure, attending outdoor sports events, and attending outdoor artistic events.

outdoor recreation—a leisure time activity which utilizes an outdoor setting.

outdoor recreation area—a land or water area administered as a unit for outdoor recreation. It may be a multiple-use area and may include both developed and undeveloped acreages.

outdoor recreation capacity—an estimate of the recreation days or activity days that can be supplied by a specific recreation resource.

outdoor recreation carrying capacity—the number of people an area or facility can handle at a given time without excessive overcrowding of recreationists and without resource damage.

outdoor recreation facility—recreation structures or any conveniences for outdoor recreation activities in a designated area. Some activities can take place without facilities but not without resources.

outdoor recreation resource—any land or water area which can be used effectively for outdoor recreation.

outdoor recreation site—a small and contiguous tract of land developed for a specific recreation activity or closely related combination of activities such as swimming, camping, or picnicking.

outdoor recreation supply—existing recreational resources and facilities capable of providing outdoor recreation.

outdoor recreation unit—a facility or group of complementary facilities, normally in a camp, picnic site or park, designed to accommodate a family. Examples would include a table, fireplace, tent site facility group or a rental cabin.

participation rate—the number of occasions of participation in an outdoor recreation activity by an individual during a measured time period as set forth in Outdoor Recreation Resources Review Commission (ORRRC) Study Report No. 19.

physical landscape—the type, amount, and distribution of natural land forms and associated natural phenomena of a region such as soil, topography, natural vegetation, and surface water.

picnicking—eating a meal out-of-doors and away from home.

planning subarea—a group of counties selected for economic and statistical analysis for the purpose of planning.

playing outdoor games or sports—any game or sport where there is competition against other persons (such as tennis, softball, badminton, etc.) or against the clock or a record (speedboat racing, auto rallies, etc.).

potential supply—land and water suitable for recreation development and use.

programmed supply—land and water iden-

tified and authorized for recreational development by the year 1980.

projected requirements—the gross estimated amount of recreational opportunities that will be required to satisfy the desires of people recreating in the Great Lakes Basin in the years 1980, 2000, and 2020.

recreation activities—include the following outdoor activities: swimming, picnicking, camping, sightseeing, hiking, nature study, boating, sailing, canoeing, water-skiing, playing outdoor games, golfing, bicycling, horseback riding, skiing, sledding, ice skating, driving for pleasure, walking for pleasure, attending outdoor games, and attending outdoor concerts.

recreation day—a visit by an individual to a recreation area for recreation purposes during a significant portion or all of a 24-hour day. A recreation day is assumed to consist of 2.5 activity occasions.

recreation design load—the maximum number of recreationists expected to use an area at any one time on a normal summer Sunday, and for which facilities and land or water would have to be provided.

recreation facilities—structures or conveniences for specific outdoor recreation activities developed in a designated area.

recreation land or water requirements—the total amount of resources normally expressed in acres needed to satisfy all recreation requirements in an area for any target year including both existing supply and unmet needs.

recreation landscape—a physical or cultural landscape with capability for recreational use and development.

recreation market area—the zone of project influence from which 80 percent or more of the people are drawn on one-day outings and overnight trips.

recreation need—the difference between an area's recreation requirements and its supply of available recreation opportunities at any given time.

recreation requirement—the total amount of participation in outdoor recreation activities that could be expected if adequate opportunities are available.

recreation resource areas—those geographic areas having physical features and land use patterns favorable to recreation development and use.

recreation service area—extends outward from a population center of a specific geographic area and encompasses the recreation resources which serve or are expected to serve the residents of that area.

recreation supply—the resources and facilities presently providing outdoor recreation opportunities.

resident population—the population residing within a prescribed geographic area.

resource requirements—acres of land and water to satisfy the recreation day requirements of the population affecting the study area.

sightseeing—intentionally observing some interesting outdoor resource, but does not include casual viewing from a car window while engaged in, for example, business travel.

sledding—the recreational use of a sled, toboggan, bobsled, or other vehicle designed for sliding over snow or ice but not including vehicles drawn by a horse or propelled mechanically.

snow skiing—any noncompetitive recreational use of skis on snow. Professional skiing is not included. Amateur competitive skiing should be included under playing outdoor games or sports.

Standard Metropolitan Statistical Area (SMSA)—a county or group of counties containing at least one city of 50,000 inhabitants or contiguous cities with a combined population of 50,000 or more. In addition to the county containing such city or cities, contiguous counties are included in an SMSA if they are metropolitan in character and are integrated socially and economically with the central city. The criteria of metropolitan character relate to the attributes of the outlying county as a place of work or residence for a concentration of nonagricultural workers and stipulate that at least

75 percent of the labor force in a county must be nonagricultural and, usually, that the county must have 50 percent or more of its population living in contiguous minor civil divisions with a density of at least 150 persons per square mile.

swimming—a recreational activity that includes bathing, diving, skin diving, playing water games, and beach loafing.

tourist—a recreationist who has traveled more than 150 miles from his permanent place of residence to reach a recreation area.

undeveloped recreation lands—land without recreation facilities which can provide extensive activities such as hunting, hiking, and nature walks and which can act as a buffer area or a scenic backdrop for intensively developed recreation areas. Also, recreation lands are frequently left undeveloped to preserve important wilderness, geologic, natural, or biologic values.

urbanized area—a city or combination of cities containing at least 50,000 inhabitants and surrounded by a closely settled area.

urban population—all persons living in places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns (except towns in New York and Wisconsin); and the densely settled urban fringe, whether incorporated or unincorporated.

vacation-use zone—a resource area which is expected to serve the vacation needs of a given population. For this study, this area lies from 150 to 250 miles from the population concentration.

walking for pleasure—any type of walking or strolling without pack for recreational or health purposes, excluding activity considered to be hiking.

water-skiing—an activity that includes all of those water-surface sports which involve a person being towed behind a boat using such equipment as water skis or aquaplanes.

water-surface activities—recreational activities which are water dependent—boating, water-skiing, canoeing, and sailing.

weekend-use zone—areas beyond the day-use recreation zone which normally require one to three hours of travel time to reach. For this study, the weekend-use zone encompasses an area between 50 and 150 miles from centers of population.

wilderness type areas—a collective term used to describe all major areas specially classified and set aside for their primitive and relatively undisturbed aesthetic values.

winter activities—recreational activities that are dependent on adequate snow cover or ice for participation in them—skiing, sledding, and ice skating.

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Annex A

ESTIMATION OF EFFECTIVE POPULATION

Effective population is that which may contribute toward the recreational requirements of any resource area. Data on the effective populations of the 15 planning subareas within the Great Lakes Region were derived in the following manner:

(1) Each planning subarea within the Great Lakes Region was designated as a recreation market.

(2) All Office of Business Economics (OBE) economic areas whose weighted centers of population lie within 250 miles of the Regional boundary were identified. Weighted centers of population were derived by finding the weighted mean of population between two cities, between a city and a weighted center of population, or between two weighted centers of population. This procedure was continued until all significant centers of population were factored into the weighting procedure for each OBE economic area. For the purposes of this discussion, it was assumed that the total population of each OBE economic area was concentrated at its weighted center of population.

(3) Using U.S. Geological Survey maps with a scale of 1:2,500,000, circles with radii of 50, 150, and 250 miles were drawn from the weighted centers of population of each OBE economic area either lying within the Region or located within 250 miles of its boundary. These circles represent the average maximum one-way distance that a family travels for day use, overnight or weekend use, and vacation use. The 50 and 150-mile circles are equivalent to one and three hours driving time for day use and weekend use, respectively. Where the weighted centers of population lie more than 50 miles from the Regional boundary, the 50-mile radius circles were omitted since they fell short of the Regional boundary. Similarly, where the weighted centers of population lie more than 150 miles from the Regional boundary, only the 250-mile circles were scribed. For this discussion, these circles were designated as the recreation service areas of their respective centers of population.

It was assumed that people would radiate equally in all directions from each population center. This premise contains certain weaknesses because some areas possess both greater scenic qualities than others and greater opportunities for development of recreational facilities. Also, in the Great Lakes Region there have been established over time, strong directional patterns of travel, especially toward the heavily-wooded north country with its many lakes. However, the magnitude of this pattern has not been measured or estimated; therefore, no adjustments were attempted.

(4) The segment of each recreation service area (day use, weekend use, or vacation use) lying within the Regional boundary was planimetered by planning subarea to determine the percentage of that recreation service area lying within each of the planning subareas.

(5) The total projected population of each OBE economic area for 1970, 1980, 2000, and 2020 was multiplied by 60 percent to obtain the number of those persons contributing to day use, by 30 percent for overnight or weekend use, and by 10 percent for vacation use. The 60, 30, and 10 percent factors were obtained from *Public Outdoor Recreation Plan for California*. A study by Lester G. Duck and Paul F. Beard of the U.S. Army Engineer Division, Ohio River, on several Corps of Engineers reservoirs in Indiana closely substantiated these figures.

(6) To compute the day-use effective population of any given planning subarea, all 'OBE economic areas whose weighted population centers lie either in or within 50 miles of the planning subarea boundary were considered. The day-use portion (60 percent) of the population of each of these OBE economic areas was then multiplied by the percent of each unit's total 50-mile service area which lies within the planning subarea. The overnight- or weekend-use and vacation-use segments of each OBE economic area's population were al-

located to a planning subarea in the same manner. However, as has already been indicated, all OBE economic areas whose weighted population centers lie within 150 miles are considered when computing weekend-use, and within 250 miles for vacation-use effective population. Where planning subareas lie in more than one State, the allocations of effective population were made by State.

(7) Where more than 10 percent of a recreation service area radiating around a given weighted center of population lay over large bodies of water, proportionate adjustments were made to redistribute that segment of population falling over such bodies of water evenly over the remainder of that recreation service area.

(8) The sum of the various portions of effective population originating from each of the recreation service areas is the effective population for that planning subarea.

Annex B

IDENTIFICATION OF PARTICIPATION RATES

The participation rates used to calculate recreation requirements in this study were produced from unpublished data developed in 1965 by the Bureau of the Census under contract to the Bureau of Outdoor Recreation for the nationwide plan for recreation, population data from the Bureau of the Census, and data published in the Outdoor Recreation Resources Review Commission (ORRRC) Report.

(1) Basic data were given in numbers of recreation occasions per year per activity by census region for all ages, for the years 1965, 1980, and 2000. These were divided by estimates of total population per census region by time frame to obtain annual per capita participation rates by activity for the West North Central, East North Central, and Middle Atlantic Census Divisions. East North Central participation rates were applied to the very small effective population inputs from the New England and South Atlantic Census Divisions. These rates were straightlined from 1980 through 2000 and then linearly extrapolated to 2020.

(2) Summer per capita participation rates per activity by census region were derived from annual per capita participation rates according to the ratio between summer and annual rates for 1960, given in Tables 1.01, 2.01, 3.01, and 4.01, ORRRC Report 19, for appropriate census divisions.

Annex C

CALCULATION OF RECREATION REQUIREMENTS

To calculate recreational requirements, elements of effective population for each planning subarea in each time frame were multiplied by the summer and annual per capita activity participation rates for the census division from which each element came. For example, that portion of the effective population derived from OBE economic area 80 (Milwaukee) and assigned to Planning Subarea 2.1 was multiplied by the per capita participation rates for the East North Central Census Division, while that portion of the effective population derived from OBE economic area 98 (Waterloo, Iowa) and assigned to Planning Subarea 2.1 was multiplied by the per capita participation rates for the West North Central Census Division.

The sum of the requirements derived from all elements of effective population in each planning subarea equals the total requirement in activity occasions by activity for each planning subarea.

Both annual and summer requirements were calculated for each planning subarea. For winter sports, winter requirement was calculated in place of summer requirement. Annual requirement is the gross requirement accruing to each planning subarea. Summer requirement (or winter requirement for winter sports) is used to calculate design loads, the number of people that must be accommodated in each activity on an average summer Sunday.

Annex D

CALCULATION OF ACREAGE NEEDS AND REQUIREMENTS

To measure the needs of people against the resource base, activity occasions must be converted to an acreage base. This required the calculation of normal summer Sunday equivalent (design) days, turnover factor for each activity, the conversion of summer activity occasions activity occasion requirements to an acreage equivalent, the calculation of the existing and potential supply base in acres and the derivation of needs in acres. This was accomplished by the following steps.

(1) The number of design days (normal summer Sunday equivalent days), provides the basis for determining average daily design loads. In this study, two different criteria were used to allow for differences in weather conditions between the northern and southern parts of the Region. The recreation season was assumed to span a period of 14 weeks extending from Memorial Day through the Labor Day weekend, an average length of 98 days. Data developed on Corps of Engineers reservoirs in Indiana and Kentucky revealed that nearly 50 percent of all attendance took place on Sunday, 14 percent on Saturday, and the remainder divided nearly equally among the other five days. Therefore, the fifteen Sundays and three holidays were assumed to represent average design days. It was assumed that three weekdays would be equivalent to one design day; therefore, the eighty remaining days would equal 27 design days, for a total of 45 design days. However an adjustment must be made for adverse weather conditions. It was assumed that 20 percent, or nine, of the gross number of design days would be lost because of weather, leaving a net of 36 design days for use in the calculation of design loads. The number of design days used in the northern planning subareas—PSAs 1.1, 1.2, 2.1, 2.4, 3.1, and 5.3—was 32 days. The same basic approach was used except the adjustment for adverse weather conditions was increased to 30 percent.

(2) Turnover refers to the number of times that a facility will be used during an average design day. The use of this factor reduces design day loads to instantaneous design loads.

$$\text{Design Load} = \frac{\text{Summer occasions by activity}}{\text{Design days x turnover factor}}$$

In this study, the turnover factors in Table 21–47 were used.

(3) Requirement in acres by activity was derived by the following formula:

$$\text{Acres Needed} = \frac{\text{Summer occasions by activity}}{\text{Design days x turnover factor x people/acre}}$$

The standards in Table 21–48 for the number of people per acre were used for planning purposes in this study.

(4) Supply information about acres of land devoted to various uses and units of facilities by activity was obtained from the Nationwide Plan Inventory, dated 1965. The States were requested to provide updating information on State and local recreation facilities constructed between 1965 and 1969 and on programmed construction through 1980. The U.S. Forest Service provided the same information on national forest lands. All of this information was adjusted by use of the design standards to reduce supply data to a common base for comparison with requirements.

TABLE 21–47 Turnover Factors

Activity	Northern Part of Basin	Southern Part of Basin
Boating	1.5	2.5
Water-Skiing	6.0	6.0
Swimming	2.0	2.0
Picnicking	2.0	2.0
Camping	1.0	1.0
Hiking	1.0	1.0
Nature Walks	8.0	8.0
Playfields	3.0	3.0
Golf	1.0	1.0
Horseback Riding	2.0	2.0
Bicycling	2.0	2.0
Ice Skating	2.0	2.0
Sledding	2.0	2.0
Snow Skiing	1.0	1.0
Canoeing	1.5	1.5
Sightseeing	10.0	10.0

TABLE 21–48 Standards for Facility Development

Activity	Northern Part of Basin	Southern Part of Basin
Boating	9 acres of water/boat 3 visitors/boat 3 acres of water/visitor	6 acres of water/boat 3 visitors/boat 2 acres of water/visitor
Water-Skiing	24 acres of water/boat 3 visitors/boat 8 acres of water/visitor	24 acres of water/boat 3 visitors/boat 8 acres of water/visitor
Parking (cars, boats, and trailers)	3 visitors/car 33 cars & trailers/acre 99 visitors/acre	3 visitors/car 33 cars & trailers/acre 99 visitors/acre
Swimming	40 sq.ft. of dry sand/person 80 sq.ft. of grass area/person 360 visitors/acre	40 sq.ft. of dry sand/person 80 sq.ft. of grass area/person 360 visitors/acre
Picnicking	5 tables/acre 4 visitors/table 20 visitors/acre	10 tables/acre 5 visitors/table 50 visitors/acre
Camping	5 campsites/acre 4 visitors/site 20 visitors/acre	8 campsites/acre 4 visitors/site 32 visitors/acre
Hiking	20 visitors/mile	40 visitors/mile
Nature Walks	50 visitors/mile	50 visitors/mile
Playfields	10 visitors/acre	20 visitors/acre
Golf	35 visitors/hole 7 acres/hole 5 visitors/acre	35 visitors/hole 7 acres/hole 5 visitors/acre
Horseback Riding	10 visitors/mile	10 visitors/mile
Bicycling	20 visitors/mile	20 visitors/mile
Ice Skating	100 sq.ft./visitor	100 sq.ft./visitor
Sledding	40 visitors/acre	40 visitors/acre
Canoeing	4 visitors/mile	4 visitors/mile
Snow Skiing	20 visitors/acre	20 visitors/acre
Parking (General)	90 cars/acre 4 visitors/car 360 visitors/acre	90 cars/acre 4 visitors/car 360 visitors/acre

(5) For 1970, needs in acres or in miles were derived for each activity by subtracting the existing supply from the 1970 requirement for each activity. For future time frames, needs in acres or in miles were derived for each activity by subtracting the existing and programmed supply from the respective activity requirements for each time frame.

Annex E

COMPUTATION OF NEEDS FOR CLASS I AND II RECREATION LANDS

The total need of each planning subarea for Class I recreation lands was computed using the Bureau of Outdoor Recreation Classification System in the following manner:

(1) An area's need in developed acres of land for water-oriented activities, outdoor games, golf, and skiing, was summarized. Needs for other activities were not considered in this analysis.

(2) Acre needs for all activities which take place chiefly either on Class I or Class II lands were then subtracted from the total to give a net acreage-need of developed land which may be either Class I or Class II. Needs for golf, camping, skiing, and boat parking were subtracted because golf has built-in buffer lands, and the others take place on Class II lands. Since playfields are located primarily on Class I lands, 50 percent of the playfield need was also deducted.

(3) The percent of the planning subarea's effective population living in SMSAs within 50 miles of its boundary was then determined.

(4) The net acreage-need for developed land which may be either Class I or Class II was then multiplied by the percentage of urban population to give urban needs.

(5) Sixty percent of all urban needs—the day-use element—were assumed to be met on Class I recreation lands. The urban need was, therefore, multiplied by 60 percent to give the acre-need of prorated Class I lands.

(6) Fifty percent of the total need for playfields (reserved specifically for Class I recreation lands) was added to the prorated Class I land need to give total need for developed Class I recreation land.

(7) It was assumed that Class I lands have an average development level of 50 percent. Therefore, the need for developed Class I lands was doubled to give total Class I land needs.

(8) The acreage need for golf was added to the above total to obtain total Class I recreation land needs.

Similar procedures were used to calculate each planning subarea's need for Class II recreation land.

(1) Acreage of developed recreation land used in the calculation of need for Class I recreation lands was deducted from the net acreage-need of developed land which may be either Class I or Class II recreation land. The remainder was assigned to Class II land.

(2) The acre-needs for camping, skiing, and boat parking were then added to the acre-need for prorated Class II lands to give the total need for developed Class II lands.

(3) In those planning subareas where existing publicly owned lands have potential for additional recreational development, the estimated amount of developed acres that could be accommodated on such land was deducted from the total acreage-need for Class II recreational lands (Table 21–93, Annex I).

(4) An average development level of 15 percent was assumed for Class II lands. Therefore, the acres of development needed on Class II lands were divided by .15 to give total acreage needed for Class II recreation lands.

The following worksheet illustrates the method for computing Class I and Class II acre needs.

Computation of Needs for Class I and II Recreation Lands

P.A. _____
Year _____

_____ 1. Total Developed-Acreage Needs [land-based, water-oriented needs (including general and boat parking + outdoor games + golf + skiing needs)]

_____ 2. Golf

_____ 3. 50 Percent of Playfields—Deduct for Specific Class I Activities

_____ 4. Camping

_____ 5. Skiing

_____ 6. Boat Parking

_____ 7. Total Deduct (Add: #2 + #3 + #4 + #5 + #6)

_____ 8. Net Acres of Developed Land (#1 − #7)

_____ 9. Percent Effective Population Derived from SMSAs within 50 Miles of Planning Subarea Boundary

_____ 10. Total Urban Needs (#8 × #9)

60% 11. Percent to be Satisfied on Class I Recreation Lands

_____ 12. Acres of Prorated Class I Lands (#10 × #11)

_____ 13. 50 Percent of Playfield Acreage (See #3)

_____ 14. Acres of Class I Needed (50 Percent Developed)

_____ 15. Total Acres of Class I Lands (#14 × 2.0)

_____ 16. Acres of Golf Courses Needed (See #2)

_____ 17. Total Acres of Urban Land (#15 + #16)

_____ 18. Acres of Developed Land—Nonurban Needs (#8 − #10)

_____ 19. Acres of Developed Land—40 Percent Urban Needs (#10 − #12)

_____ 20. Acres of Camping (See #4)

_____ 21. Acres of Skiing (See #5)

_____ 22. Acres of Boat Parking (See #6)

_____ 23. Total Acres of Developed Land—Type II (#18 + #19 + #20 + #21 + #22)

_____ 24. Percent of Class II Needs to be Met on Existing Publicly Owned Land

_____ 25. Acres to be Satisfied on Existing Publicly Owned Land (#23 × #24)

_____ 26. Acres of Type II Developed Land to be Satisfied on New Acquisitions (#23 − #25)

_____ 27. Total Acres to be Acquired for Type II Recreation Areas (#26 ÷ .15)

_____ 28. Total New Lands Needed for Recreation (#17 + #27)

Annex F

LAKES AND STREAMS WITH IMPAIRED WATER QUALITY AS OF 1970

Lake Superior Basin[64]

St. Louis River—lightly impaired between Hibbing and Floodwood; moderately impaired between Floodwood and Lake Superior
Lester River and Amity Creek—moderately impaired in lower six miles of each
Nemadji River—moderately impaired in lower 10 miles
Boyd Creek—grossly impaired in lower 10 miles
Montreal River—lightly impaired above and below Ironwood
Black River—lightly impaired below Ramsay and Wakefield
Presque Isle River—lightly impaired near Marinesco
Mineral River—lightly impaired in lower eight miles
Ontonagon River—lightly impaired in lower 10 miles
Carp River—lightly impaired between Negaunee and Lake Superior
Tahquamenon River—lightly impaired below Newberry
St. Marys River—lightly impaired below Sault Ste. Marie

Lake Michigan Basin[62]

Menominee River—moderately impaired from Route 2 crossing near Iron Mountain, Michigan, to Soo Line Crossing about 20 miles downstream; lightly impaired downstream for an additional 20 miles
Fox River—grossly impaired between Lake Winnebago and Green Bay
Escanaba River—grossly impaired in lower 10 miles
Peshtigo River—lightly impaired between Peshtigo and Green Bay
Manitowoc River—grossly impaired in lower 10 miles at Manitowoc; moderately impaired in next 10 miles upstream
Milwaukee River—grossly impaired in lower 10 miles in Milwaukee; moderately impaired in next 15 miles upstream
Root River—grossly impaired in lower five miles in Racine; moderately impaired in next 10 miles upstream
Little Calumet River—grossly impaired
St. Joseph River and tributaries—grossly impaired from below South Bend to above Elkhart, Indiana; moderately impaired in vicinity of Niles, Michigan; lightly impaired below Buchanan and Three Rivers, Michigan
Paw Paw River—lightly to moderately impaired from Paw Paw, Michigan, to Lake Michigan
Kalamazoo River—grossly impaired from Kalamazoo to Allegan, Michigan; moderately impaired for an additional 10 miles below Allegan; lightly impaired at Marshall, Albion, between Battle Creek and Kalamazoo, and in lower 10 miles
Grand River and tributaries—grossly impaired for 10 miles below Jackson and between Okemos on Red Cedar River and Grand Ledge; moderately impaired for five miles above Okemos, 20 miles upstream from Lansing, between Grand Ledge and Portland,

for 10 miles below both Ionia and Grand Rapids, and at New Haven; lightly impaired on remaining segments

Lake Huron Basin[61]

Black River—grossly impaired near Cheboygan
Thunder Bay River—grossly impaired near Alpena
Saginaw River and tributaries—tributaries grossly impaired above Flint; moderately impaired for 10 miles below Flint, Midland, and Fenton, and for lesser distances below Frankenmuth, Vassar, and Chesaning, and from Saginaw to Saginaw Bay; lightly impaired on the lower segments of the Cass, Flint, Tittabawassee, and Kawkawlin Rivers
Pigeon River—lightly impaired for 10 miles below Pigeon

Lake Erie Basin[60]

Clinton River—grossly impaired below Mt. Clemens
Rouge River—grossly impaired below Dearborn
Huron River (Michigan)—grossly impaired below Ann Arbor; moderately impaired between Dexter and Ann Arbor
Raisin River—grossly impaired at Monroe
Maumee River and tributaries—grossly impaired in Ottowa River for 10 miles below Lima, in the lower five miles of both the St. Joseph and St. Marys River at Fort Wayne, in eight miles of the Maumee below Fort Wayne, and the lower 10 miles of the Maumee at Toledo; moderately impaired in the remainder of the Maumee, the Blanchard and Auglaize Rivers between Findlay and Defiance, the St. Marys below Rockford, the St. Joseph between Montpelier and the Ohio-Indiana line; lightly impaired in the Indiana segment of the St. Joseph River
Portage River—moderately impaired in lower 20 miles
Sandusky River—moderately impaired between Bucyrus and Sandusky Bay
Huron River (Ohio)—moderately impaired between Norwalk and Lake Erie
Vermilion River—moderately impaired in lower five miles
Black River—grossly impaired between Elyria and Lake Erie; moderately impaired for 12 miles upstream from Elyria
Rocky River—grossly impaired between Berea and Lake Erie; moderately impaired between Brunswick and Berea
Cuyahoga River—grossly impaired between Kent and Lake Erie
Chagrin River—moderately impaired through Lake County; lightly impaired for 12 miles upstream from Lake County
Grand River—grossly impaired in lower six miles
Ashtabula River—moderately impaired in lower five miles
Conneaut River—moderately impaired at Conneaut
Cattaraugus River—grossly impaired between Gowanda and Lake Erie
Buffalo River—grossly impaired in lower eight miles
Tonawanda River—grossly impaired in lower 10 miles
Niagara River—grossly or moderately impaired from Lake Erie to Lake Ontario

Lake Ontario Basin[63]

Eighteenmile Creek—grossly impaired for eight miles below Lockport; moderately impaired from that point to Lake Ontario
Oak Orchard Creek—moderately impaired in lower 15 miles
Genesee River and tributaries—moderately impaired from south of Rochester to Lake Ontario and for about 10 miles below LeRoy on Oatka Creek and Honeoye Falls on Honeoye Creek; lightly impaired on remainder of Genesee in New York State, lower

Honeoye Creek, remainder of Oatka Creek below Warsaw, and Cohocton Creek below Dansville

Canandaigua Outlet—moderately impaired from Canandaigua Lake to the Barge Canal

Seneca River—grossly impaired for five miles below Waterloo and Auburn; moderately impaired on remainder between Seneca Lake and Barge Canal

Oswego River and tributaries—grossly impaired through Syracuse and for several miles downstream, lower five miles of outlet from Otisco Lake; moderately impaired on tributaries to east and south of Oneida Lake, Oswego River between Fulton and Lake Ontario, and eight miles below Marcellus; lightly impaired in Oswego River between Fulton and Barge Canal, outlet from Skaneateles Lake to Barge Canal

Little Salmon River—moderately impaired

Salmon River—lightly impaired below Pulaski

Sandy Creek—lightly impaired in lower 15 miles each of main stem and North Branch

Black River—grossly impaired for 10 miles below Port Leyden and eight miles below Carthage; moderately impaired throughout remainder of stream below Port Leyden

Oswegatchie River—moderately impaired for 10 miles below Gouverneur; lightly impaired from that point to St. Lawrence River

Grass River—moderately impaired below Madrid

Raquette River—moderately impaired for 12 miles below Potsdam and between Massena and St. Lawrence River; lightly impaired above Massena

Lake Superior[64]

Lake Superior near Munising, Michigan—lightly impaired

Lake Superior near Marquette, Michigan—lightly impaired

Keweenaw Bay near L'Anse, Michigan—lightly impaired

Chequamegon Bay near Ashland, Wisconsin—lightly impaired

Spirit Lake and St. Louis Bay near Superior, Wisconsin—portions moderately and grossly impaired

Spirit Lake and St. Louis Bay near Duluth, Minnesota—moderately and grossly impaired

Lake Superior near Silver Bay, Minnesota—moderately impaired

Portage Lake and Torch Lake near Houghton, Michigan—portions lightly and moderately impaired

Lake Michigan[62]

Little Bay de Noc near Escanaba, Michigan—grossly impaired

Green Bay near Marinette, Wisconsin—lightly and moderately impaired

Green Bay near Green Bay, Wisconsin—moderately impaired for about 25 miles along both shores

Sturgeon Bay near Sturgeon Bay, Wisconsin—grossly impaired

Eagle Harbor near Ephraim, Wisconsin—lightly impaired

Lake Michigan near Manitowoc, Wisconsin—moderately and grossly impaired

Lake Winnebago near Oshkosh, Fond du Lac and Appleton, Wisconsin—moderately impaired

Lake Michigan near Sheboygan, Wisconsin—moderately and grossly impaired

Lake Michigan near Milwaukee, Racine, and Kenosha, Wisconsin—moderately and grossly impaired

Lake Michigan near Waukegan, Illinois—moderately and grossly impaired

Lake Michigan near Chicago—lightly impaired

Lake Michigan near Benton Harbor, Michigan—moderately impaired

Lake Michigan and Lake Macatawa near Holland, Michigan—grossly impaired

Grand Traverse Bay near Traverse City, Michigan—moderately impaired

Lake Michigan near East Chicago and Gary, Indiana—moderately and grossly impaired

Lake Michigan near Muskegon, Michigan—lightly impaired

Lake Michigan near Grand Haven—moderately impaired

Lake Michigan near Saugatuck—lightly impaired

Houghton Lake—lightly impaired

Lake Huron[61]

Lake Huron near Cheboygan, Michigan—moderately impaired
Thunder Bay near Alpena, Michigan—moderately impaired
Saginaw Bay near Bay City, Michigan—lightly impaired
Lake Huron near Harbor Beach, Michigan—lightly and moderately impaired

Lake Erie[60]

Lake St. Clair near New Baltimore, Michigan—moderately impaired
Lake St. Clair near Mount Clemens, Michigan—grossly impaired
Lake St. Clair near St. Clair Shores, Michigan—lightly impaired
Detroit River near Detroit, Michigan—grossly impaired
Lake Erie from Huron River to Monroe, Michigan—grossly impaired
Maumee Bay and Western Lake Erie shore near Toledo, Ohio—moderately impaired
Lake Erie near Port Clinton, Ohio, around Marblehead Peninsula—lightly impaired
Sandusky Bay near Sandusky, Ohio—lightly and moderately impaired
Lake Erie near Ashtabula, Ohio—moderately impaired
Lake Erie near Conneaut, Ohio—moderately impaired
Lake Erie near Erie, Pennsylvania—moderately impaired
Lake Erie near Buffalo, New York—moderately and grossly impaired
Lake Erie near Cleveland, Ohio—grossly impaired

Lake Ontario[63]

Lake Ontario near Rochester, New York—lightly impaired
Lake Ontario near Watertown, New York—lightly impaired
Seneca Lake near Geneva, New York—moderately impaired
Cayuga Lake near Cayuga, New York—moderately impaired
Onondaga Lake near Syracuse, New York—moderately impaired
Oneida Lake near Rome and Syracuse, New York—lightly and moderately impaired
New York State Barge Canal—lightly impaired

Annex G

EVALUATION OF POTENTIAL RECREATION AREAS' ABILITY TO SATISFY NEEDS

Specific data on many of the elements in the regional plan were not available. Therefore, a system of models was devised to represent the major types of resource bases represented among the plan elements. Because two different sets of standards were used to calculate requirements and needs in acres, one for the southern part and one for the northern part of the Region, two comparable sets of models were constructed based on the design standards for the two respective parts of the Region.

The models for the southern part were constructed around recreational areas developed on lakeshores, stream valleys and general or regional types of resource bases. In setting up the three models an attempt was made to reasonably balance the mix of activities among the several models to the total requirements for each of the following six land-based, water-oriented activities in the Region: swimming, picnicking, camping, hiking, nature study, and sightseeing. This permitted the presentation of a reasonable mix of activities on the several types of resource base in approximate equilibrium with the requirement for each of these recreational activities. The amount of facility development in each model was based on the characteristics of that resource base. It is recognized that the mix of facilities will change according to the distance from urban areas, so models represent an average for that type of resource base.

The lakeshore model was centered on an area one-half mile wide and containing two miles of Great Lakes shore, or an equivalent of 640 acres. The activity mix in Table 21–49 was used.

Since the model includes some non-water-oriented activities, it was graded for its efficiency to meet land-based, water-oriented needs as compared to the total plan of development. For example, in this model only 85 percent of the total developed land is for land-based, water-oriented activities. This efficiency factor was then applied to the total acres of land in each plan element to derive the amount of land that would be used to support land-based, water-oriented activities.

The regional park model was centered on an area containing 2000 acres of land and 1000 acres of water. The activity mix in Table 21–50 was used.

The stream valley model was centered on a five-mile segment of stream valley with an average width of one-half mile. It contains about 1600 acres, of which 100 are water surface. The stream segments for which this model was designated were assumed to lie near urban areas and were designed for substantial amounts of general recreational activities. The mix of activities in Table 21–51 was used.

A series of four models was used for the northern part of the Region, including Planning Subareas 1.1, 1.2, 2.1, 2.4, 3.1, and 5.3. These models included one for each of the following resource type: lakeshore park, regional park, stream valley park, and natural area. In the application of these models to specific resource elements in each of the planning subareas, some of the remote stream valleys were treated as natural areas.

The models for the northern part of the Region were constructed by using the design standards for that part of the Region.

The lakeshore model was centered on two miles of shore with 640 acres of land; the mix of activities in Table 21–52 was used in this model.

The stream valley model for the northern part of the Region was based on five miles of valley one-half mile wide and includes 1600 acres with 100 acres of water surface. The mix of activities in Table 21–53 was used in this model.

The regional park model was based on 2000

TABLE 21-49 Activity Mix, Southern Lakeshore Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	15	--	446,000
Picnicking	15	--	84,000
Camping	30	--	56,000
Hiking	--	5	12,000
Nature Walks	--	1	58,000
Sightseeing	--	--	302,000
Playfields	10	--	(61,000)*
Horseback Riding	--	5	(12,000)*
Bicycling	--	--	---
General Parking	18	--	---
Boating	--	--	(65,000)*
Water-Skiing	--	--	---
Boat Parking	6	--	---
Total	94		958,000
Total Recreation Days			383,000
Total acres developed for land-based, water-oriented recreation	78*		
Recreation days per 1000 acres of land			600,000

*Since these models were set up to evaluate plan elements for plans formulation, only land-based, water-oriented activities were included in the total.

TABLE 21-50 Activity Mix, Southern Regional Park Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	15	--	446,000
Picnicking	80	--	449,000
Camping	100	--	149,000
Hiking	--	15	36,000
Nature Study	--	1.5	87,000
Sightseeing	--	--	537,000
Playfields	50	--	(305,000)*
Horseback Riding	--	5	(12,000)*
Bicycling	--	10	(43,000)*
General Parking	32	--	---
Boating	--	--	(43,000)*
Water-Skiing	--	--	(7,000)*
Boat Parking	5	--	---
Total	282		1,704,000
Total Recreation Days			682,000
Total acres developed for land-based, water-oriented recreation	227		

*See footnote, Table 21-49.

TABLE 21-51 Activity Mix, Southern Stream Valley Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	10	--	298,000
Picnicking	60	--	337,000
Camping	5	--	8,000
Hiking	--	15	36,000
Nature study	--	1	58,000
Sightseeing	--	--	339,000
Playfields	100	--	(487,000)*
Horseback Riding	--	10	(24,000)*
Bicycling	--	15	(65,000)*
Boating	--	--	(5,000)*
Boat Parking	2	--	---
General Parking	26	--	---
Total	203		1,076,000
Total Recreation Days			430,000
Total acres developed for land-based, water-oriented recreation	101		

Efficiency for land-based, water-oriented activities is about 50 percent.

*See footnote, Table 21-49.

TABLE 21-52 Activity Mix, Northern Lakeshore Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	10	00	265,000
Picnicking	30	--	59,000
Camping	40	--	42,000
Hiking	--	5	5,000
Nature Study	--	1	52,000
Sightseeing	--	--	195,000
Playfields	10	--	(28,000)*
Horseback Riding	--	5	(10,000)*
Bicycling	--	--	---
Boating	--	--	(57,000)*
Boat Parking	6	--	---
General Parking	12	--	---
Total	108		618,000
Total Recreation Days			247,000
Total acres developed for land-based, water-oriented recreation	92		
Recreation days per 1000 acres of land			386,000

Efficiency for land-based, water-oriented recreation is about 85 percent.

*See footnote, Table 21-49.

TABLE 21-53 Activity Mix, Northern Stream Valley Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	5	--	132,000
Picnicking	80	--	159,000
Camping	25	--	26,000
Hiking	--	15	17,000
Nature Study	--	1	52,000
Sightseeing	--	--	178,000
Playfields	60	--	(164,000)*
Horseback Riding	--	5	(10,000)*
Bicycling	--	10	(39,000)*
Boating	--	--	(3,000)*
Water-Skiing	--	--	---
General Parking	13	--	---
Boat Parking	--	--	---
Total	183		564,000
Total Recreation Days			226,000
Total acres developed for land-based, water oriented recreation	123		
Recreation days per 1000 acres of land			150,000

Efficiency for land-based, water-oriented recreation is about 67 percent.

*See footnote, Table 21-49

TABLE 21-54 Activity Mix, Northern Regional Park Model

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	10	--	265,000
Picnicking	80	--	159,000
Camping	150	--	156,000
Hiking	--	20	21,000
Nature Study	--	2	104,000
Sightseeing	--	--	324,000
Playfields	30	--	(82,000)*
Horseback Riding	--	10	(20,000)*
Bicycling	--	10	(39,000)*
Boating	--	--	(20,000)*
Water-Skiing	--	--	(6,000)*
General Parking	18	--	---
Boat Parking	3	--	---
Total	291		1,029,000
Total Recreation Days			412,000
Total acres developed for land-based, water-oriented recreation	258		
Recreation days per 100 acres of land			206,000

Efficiency for land-based, water-oriented recreation is about 90 percent.

*See footnote, Table 21-49.

TABLE 21-55 Activity Mix, Natural Area

Activity	Developed Land Acres	Developed Land Miles	Annual Activity Days of Use
Swimming	10	--	298,000
Picnicking	50	--	100,000
Camping	200	--	207,000
Hiking	--	50	53,000
Nature Study	--	3	152,000
Sightseeing	--	--	373,000
Playfields	20	--	(54,000)*
Horseback Riding	--	20	(44,000)*
Bicycling	--	10	(39,000)*
Boating	--	--	---
Water-Skiing	--	--	---
General Parking	18	--	---
Boat Parking	--	--	---
Total	298	1,183,000	1,183,000
Total Recreation Days			473,000
Total acres developed for land-based, water-oriented recreation	278		
Recreation days per 1000 acres of land			47,000

Efficiency for land-based, water-oriented recreation is about 93 percent.

*See footnote, Table 21-49.

acres of land and 1000 acres of water surface. The mix of activities in Table 21-54 was used.

The natural area was based on 10,000 acres of land with minimal development of facilities. It was considered to be a nature area, not a true wilderness setting. The mix of activities in Table 21-55 was used for this model.

From these models the following information was developed for providing input into plan formulation for each of the fifteen planning subareas in the Region. For example, if a tract of land containing 2000 acres and located in the southern part of the Region had potential as a regional park, its capacity to satisfy needs would be calculated by multiplying 340,000, 120, and 680 by two to obtain its input into plan formulation in recreation days, developed land, and undeveloped land. Thus, the potential of each resource element to satisfy needs in plan formulation could be readily evaluated from Table 21-56.

TABLE 21-56 Input into Plans Formulation, per 1000 Acres of Resource Base (Land Only)

Model Type	Size	Efficiency for land-based, water-oriented recreational activities (Percent)	Effective amount of input per 1000 acres of land		
			Recreation Days (1,000)	Developed Land (Acres)	Undeveloped Land (Acres)
Southern Part of Basin					
Regional Park	2000 acres land, 1000 acres water	80	340	120	680
Stream Valley Park	1500 acres land, 100 acres water	50	284	70	430
Lakeshore Park	640 acres land, water-unlimited	85	600	130	720
Northern Part of Basin					
Regional Park	2000 acres land, 1000 acres water	90	206	130	770
Stream Valley Park	1500 acres land, 100 acres water	67	150	80	590
Lakeshore Park	640 acres land, water-unlimited	85	386	150	700
Natural Areas Park	10,000 acres land	93	47	30	900

Annex H

CALCULATION OF FACILITY COSTS

Facility costs were calculated using the same models that were used to determine the ability of resources within the Region to meet recreation needs in plans formulation. The cost of providing the necessary facilities for 1000 people at any one time was estimated. These figures were applied to the instantaneous design load of each land-based, water-oriented activity for each model. The cost data for each activity include costs for the facilities for the specific activity and associated parking, sanitary facilities, power, and water. Costs for roads, sewage treatment facilities, administration, landscaping, and signs were computed separately for the total instantaneous design load for that model. The gross costs and the costs per 1000 acres of land for each of the models in the southern and northern parts of the Region follow in Table 21–57.

Facility costs for each plan element were computed from the acreage and the appropriate cost per 1000 acres of land. For example, the facility costs for a 4700-acre tract of land with potential for a regional park in the southern part of the Region were computed by multiplying $2,119,000 by 4.7 which equals $9,959,000. If the land costs for a 4700-acre tract were estimated at $2000 per acre, they would amount to $9,400,000. In this illustration, total costs for land and facilities would total $19,359,000.

For those plan elements where specific cost data are available, those data were used in the costing procedure.

TABLE 21–57 Costs for Models

Model Type	Total Facility Cost Per Unit (1,000)	Acres of Land Per Unit	Facility Cost/1000 Acres of Land (1,000)
Southern Part of Basin			
Regional Park	4,238	2,000	2,119
Stream Valley Park	1,944	1,500	1,296
Lakeshore Park	2,167	640	3,386
Northern Part of Basin			
Regional Park	2,981	2,000	1,490
Stream Valley Park	1,205	1,500	800
Lakeshore Park	1,368	640	2,138
Natural Area Park	562	10,000	58

Annex I

SUPPLEMENTARY STATISTICAL TABLES

TABLE 21-58 Projections of Population by Planning Subarea in the Great Lakes Region

Planning Subarea	POPULATION 1970 Actual (1000s)	1980 Projected (1000s)	2000 Projected (1000s)	2020 Projected (1000s)	Percentage of Change 1971-2020
1.1	339.4	366.6	417.2	475.0	39.9
1.2	185.0	171.3	177.4	193.8	4.7
Lake Superior Area	524.4	537.9	594.6	668.8	27.5
2.1	992.6	1,082.1	1,357.6	1,726.0	73.8
2.2	9,389.7	10,999.0	13,844.5	17,385.7	85.1
2.3	2,494.7	2,914.0	3,771.9	4,876.4	95.4
2.4	486.8	547.2	671.4	841.4	72.8
Lake Michigan Area	13,363.8	15,542.3	19,645.4	24,829.5	85.7
3.1	137.3	164.3	208.7	267.0	94.4
3.2	1,083.5	1,246.8	1,600.5	2,057.4	89.8
Lake Huron Area	1,220.8	1,411.1	1,809.2	2,324.4	90.3
4.1	4,803.4	5,801.7	7,425.2	9,567.6	99.1
4.2	1,708.9	1,963.5	2,473.8	3,116.2	99.1
4.3	3,069.8	3,476.4	4,389.2	5,526.5	80.0
4.4	1,820.1	2,058.0	2,506.0	3,070.2	68.6
Lake Erie Area	11,402.2	13,299.6	16,794.2	21,280.5	86.6
5.1	937.4	978.2	1,221.8	1,538.0	64.0
5.2	1,343.9	1,571.7	2,015.9	2,556.5	90.2
5.3	220.7	225.7	257.2	298.6	35.2
Lake Ontario Area	2,502.0	2,775.6	3,494.9	4,393.1	75.5
Great Lakes Region	29,013.2	32,296.5	42,338.3	53,496.3	84.3

TABLE 21–59 Distribution of SMSA Population in the Great Lakes Region

Planning Subarea	1970 POPULATION Total (1000s)	1970 POPULATION In SMSA (1000s)	Percentage of Population in SMSA	Percentage of Total SMSA Population
1.1	339.4	262.0	77.2	1.1
1.2	185.0	0.0	0.0	0.0
Lake Superior	524.4	262.0	50.0	1.1
2.1	992.6	157.3	15.8	0.7
2.2	9,389.7	9,204.1	98.0	38.3
2.3	2,494.7	1,528.7	61.3	6.4
2.4	486.8	156.1	32.0	0.6
Lake Michigan	13,363.8	11,046.2	82.7	46.0
3.1	137.3	0.0	0.0	0.0
3.2	1,083.5	827.8	76.4	3.4
Lake Huron	1,220.8	827.8	67.8	3.4
4.1	4,803.4	4,511.3	93.9	18.8
4.2	1,708.9	1,016.2	59.5	4.2
4.3	3,069.8	2,972.5	96.8	12.4
4.4	1,820.1	1,594.4	87.6	6.6
Lake Erie	11,402.2	10,094.4	88.5	42.0
5.1	937.2	875.6	93.4	3.7
5.2	1,343.9	919.8	68.4	3.8
5.3	220.7	0.0	0.0	0.0
Lake Ontario	2,502.0	1,795.4	71.8	7.5
Great Lakes Region	29,013.2	24,025.8	82.8	100.0

TABLE 21–60 Effective Population by Planning Subarea for the Years 1970–2020 (in thousands)

Planning Subarea	% Derived From SMSAs 1970	1970	1980	2000	2020
1.1	48.5	378.4	403.5	469.8	550.3
1.2	3.6	161.6	165.6	184.2	214.3
2.1	34.1	1,344.8	1,489.4	1,879.3	2,393.7
2.2	89.1	5,977.0	6,700.7	8,404.5	10,535.6
2.3	70.1	2,785.1	3,153.5	4,040.2	5,183.3
2.4	62.2	710.0	796.4	1,009.4	1,286.6
3.1	55.6	270.6	303.2	382.0	484.1
3.2	74.4	1,096.3	1,239.8	1,471.2	2,001.9
4.1	92.8	2,985.1	3,414.8	4,357.6	5,581.6
4.2	72.5	1,627.3	1,841.8	2,359.6	3,027.0
4.3	80.1	2,068.5	2,288.7	2,836.2	3,566.2
4.4	69.5	997.8	1,070.5	1,301.9	1,596.7
5.1	75.8	847.8	937.6	1,162.8	1,447.0
5.2	72.9	1,317.3	1,465.0	1,827.9	2,286.6
5.3	53.9	287.1	315.9	387.8	477.4
Total		22,854.7	25,586.4	32,174.4	40,632.3

TABLE 21-61 Employment by Selected Industries in the Great Lakes Region

Basin	1960 Actual	1970 Projected	1980 Projected	2000 Projected	2020 Projected
Lake Superior Basin					
Total Employment	174,478	182,100	194,900	221,800	251,500
Agric., Forest, Fish	7,624	5,700	4,500	2,900	1,800
Mining	21,935	17,300	17,200	16,800	16,600
Manufacturing	27,660	28,400	29,400	30,300	34,800
Federal Military	5,828	7,000	6,700	6,700	6,700
Other*	111,431	123,700	137,100	163,800	191,600
Lake Michigan Basin					
Total Employment	4,675,422	5,530,000	6,378,000	8,107,800	10,198,000
Agric., Forest, Fish	142,244	113,900	97,100	69,500	99,700
Mining	7,253	6,200	6,100	6,200	6,100
Manufacturing	1,769,066	1,959,300	2,101,300	2,357,400	2,705,000
Federal Military	32,333	35,500	34,200	34,200	34,200
Other*	2,724,526	3,413,900	4,138,400	5,639,700	7,402,000
Lake Huron Basin					
Total Employment	355,981	449,600	530,200	698,000	907,000
Agric., Forest, Fish	21,328	16,100	12,400	9,300	4,500
Mining	2,032	1,800	1,800	1,600	1,500
Manufacturing	146,562	177,100	201,300	247,100	305,900
Federal Military	1,797	8,000	7,600	7,600	7,600
Other*	184,262	247,600	308,100	434,800	587,800
Lake Erie Basin					
Total Employment	3,801,375	4,549,700	5,283,100	6,736,100	8,530,100
Agric., Forest, Fish	87,321	70,100	60,000	48,000	30,500
Mining	5,705	5,200	5,300	5,500	5,700
Manufacturing	1,532,536	1,700,000	1,816,000	2,015,600	2,786,700
Federal Military	11,698	10,100	9,600	9,600	9,600
Other*	2,164,205	2,764,500	3,392,300	4,662,500	6,197,900
Lake Ontario Basin					
Total Employment	834,585	964,200	1,108,800	1,411,800	1,775,700
Agric., Forest, Fish	47,342	37,200	31,600	22,600	16,100
Mining	3,566	2,500	2,400	2,100	1,900
Manufacturing	295,157	326,200	355,800	413,900	485,800
Federal Military	5,635	5,000	4,800	4,800	4,800
Other*	482,885	592,800	714,000	968,100	1,266,700
Great Lakes Region					
Total Employment	9,841,841	11,675,617	13,494,973	17,175,526	21,662,300
Agric., Forest, Fish	305,769	243,130	205,413	145,187	102,682
Mining	40,491	33,101	32,669	32,312	31,834
Manufacturing	3,770,981	4,190,923	4,503,788	5,065,756	5,518,400
Federal Military	57,291	65,660	63,185	63,180	63,183
Other*	5,667,309	7,142,503	8,689,718	11,868,891	15,646,093

*Other--category includes contact construction; transportation; communications; public utilities, wholesale, retail trade; finance, insurance, real estate; services and public administration.

Source: GLBCFS Technical Report No. 19-II-P-2, May 1969.

TABLE 21-62 Existing and Projected Per Capita Income for the Great Lakes Region

	IN 1958 DOLLARS				
Planning Subarea	1962 (Actual)	1970 Projected	1980 Projected	2000 Projected	2020 Projected
1.1	1,964	2,762	3,767	6,720	11,814
1.2	1,673	2,438	3,427	6,422	11,828
Lake Superior Area	1,861	2,654	3,658	6,631	11,819
2.1	1,993	2,723	3,778	6,646	11,755
2.2	2,910	3,726	4,849	7,999	13,280
2.3	2,206	2,948	3,985	6,961	12,201
2.4	1,771	2,383	3,271	5,860	10,415
Lake Michigan Area	2,671	3,462	4,553	7,633	12,864
3.1	1,597	1,944	2,700	4,963	8,776
3.2	2,229	3,057	4,205	7,446	12,953
Lake Huron Area	2,156	2,925	4,030	7,159	12,473
4.1	2,526	3,438	4,607	7,613	12,745
4.2	2,301	3,123	4,178	7,267	12,612
4.3	2,551	3,425	4,508	7,502	12,847
4.4	2,252	3,177	4,253	7,321	12,483
Lake Erie Area	2,451	3,346	4,463	7,489	12,714
5.1	2,615	3,533	4,713	8,046	13,613
5.2	2,168	2,962	3,993	6,989	12,126
5.3	1,798	2,643	3,557	6,477	11,640
Lake Ontario Area	2,291	3,138	4,211	7,321	12,613
Great Lakes Region	2,513	3,353	4,453	7,516	12,754
United States	2,258	3,046	4,112	7,161	12,411

TABLE 21-63 Per Capita Participation Rates, All Ages—1965, 1980, 2000, and 2020

WEST NORTH CENTRAL								
	1965		1980		2000		2020	
Activity	Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
Picnicking	4.77	3.07	5.35	3.44	5.81	3.74	6.18	3.97
Driving for Pleasure	10.90	4.10	12.26	4.61	13.07	4.91	13.60	5.11
Sightseeing	4.16	1.70	5.05	2.06	5.93	2.42	6.76	2.76
Walking for Pleasure	6.19	1.41	6.79	1.55	7.64	1.74	8.60	1.96
Swimming	6.96	6.03	9.03	7.83	11.26	9.76	13.28	11.51
Attend Outdoor Sports Events	3.60	1.61	4.15	1.85	4.63	2.06	5.05	2.25
Boating (except Canoeing and Sailing)	3.03	2.03	4.01	2.69	5.03	3.37	6.00	4.02
Bicycling	5.61	1.87	6.00	2.00	6.48	2.16	6.97	2.33
Nature Study	0.90	0.22	1.00	0.25	1.08	0.27	1.13	0.28
Sledding	1.31	----	1.49	----	1.88	----	2.33	----
Attend Outdoor Concerts	0.63	0.46	0.79	0.58	1.00	0.74	1.19	0.87
Camping	0.98	0.60	1.39	0.85	1.82	1.12	2.18	1.34
Ice Skating	0.84	----	1.19	----	1.53	----	1.86	----
Horseback Riding	1.35	0.40	1.51	0.45	1.73	0.51	2.40	0.71
Hiking	0.35	0.21	0.49	0.29	0.61	0.37	0.78	0.47
Water Skiing	0.52	0.40	0.83	0.65	1.18	0.92	1.56	1.21
Skiing	0.19	----	0.19	----	0.18	----	0.15	----
Canoeing	0.19	0.10	0.26	0.14	0.32	0.17	0.40	0.22
Sailing	0.11	0.08	0.14	0.10	0.18	0.13	0.21	0.15
Golf	1.84	0.92	2.42	1.21	3.30	1.65	3.90	1.95
Outdoor Games w/o Golf	11.49	3.82	15.28	5.08	20.67	6.87	25.41	8.11
Outdoor Games with Golf	13.33	4.74	17.70	6.29	23.97	8.52	28.31	10.06

Derived from NWP for 1965, 1980, and 2000; projected straight-line to 2020. Summer rates derived by same ratio existing between annual and summer rates in ORRRC #19.

TABLE 21-63(continued) Per Capita Participation Rates, All Ages—1965, 1980, 2000, and 2020

EAST NORTH CENTRAL

Activity	1965		1980		2000		2020	
	Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
Picnicking	4.25	2.75	4.78	3.07	5.21	3.35	5.65	3.63
Driving for Pleasure	10.90	4.13	12.35	4.64	13.17	4.95	13.80	5.19
Sightseeing	4.90	2.01	5.90	2.41	7.04	2.87	8.18	3.34
Walking for Pleasure	8.28	1.90	9.15	2.09	10.30	2.35	11.44	2.61
Swimming	7.07	6.17	9.25	8.02	11.54	10.00	13.10	11.36
Attend Outdoor Sports Events	3.12	1.40	3.62	1.61	4.04	1.80	4.42	1.97
Boating (except Canoeing and Sailing)	2.38	1.61	3.17	2.12	3.98	2.67	4.76	3.19
Bicycling	6.66	2.24	7.17	2.39	7.75	2.59	8.34	2.79
Nature Study	1.03	0.26	1.16	0.29	1.24	0.31	1.34	0.33
Sledding	1.22	----	1.39	----	1.77	----	2.19	----
Attend Outdoor Concerts	0.43	0.32	0.55	0.40	0.69	0.51	0.80	0.59
Camping	0.90	0.56	1.28	0.79	1.68	1.03	2.08	1.28
Ice Skating	1.02	----	1.44	----	1.88	----	2.30	----
Horseback Riding	0.91	0.27	1.02	0.30	1.18	0.35	1.36	0.40
Hiking	0.43	0.26	0.61	0.37	0.76	0.46	0.88	0.53
Water Skiing	0.43	0.34	0.68	0.53	0.98	0.76	1.28	1.00
Skiing	0.25	----	0.24	----	0.24	----	0.24	----
Canoeing	0.16	0.09	0.22	0.12	0.27	0.15	0.32	0.17
Sailing	0.14	0.10	0.18	0.13	0.23	0.16	0.30	0.21
Golf	1.42	0.71	1.86	0.93	2.54	1.27	2.96	1.48
Outdoor Games w/o Golf	15.26	5.23	20.14	6.90	27.28	9.34	32.22	11.04
Outdoor Games with Golf	16.68	5.94	22.06	7.83	29.82	10.61	35.18	12.52

Derived from NWP Data for 1965, 1980, and 2000; projected straight line to 2020. Summer rates derived by same ratio existing between annual and summer rates in ORRRC Report #19.

TABLE 21-63(continued) Per Capita Participation Rates, All Ages—1965, 1980, 2000, and 2020

MIDDLE ATLANTIC

Activity	1965		1980		2000		2020	
	Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
Picnicking	3.29	2.45	3.70	2.76	4.04	3.01	4.26	3.17
Driving for Pleasure	9.49	3.22	10.77	3.65	11.55	3.92	12.00	4.07
Sightseeing	4.73	1.85	5.81	2.27	6.89	2.69	7.70	3.01
Walking for Pleasure	10.19	2.67	11.32	2.97	12.86	3.37	14.58	3.82
Swimming	8.94	7.64	11.72	10.02	14.70	12.57	17.50	14.96
Attend Outdoor Sports Events	2.39	0.85	2.76	0.99	3.10	1.11	3.34	1.19
Boating (except Canoeing and Sailing)	1.30	1.01	1.73	1.35	2.17	1.69	2.60	2.03
Bicycling	4.03	1.10	4.35	1.19	4.75	1.30	5.10	1.39
Nature Study	0.77	0.31	0.87	0.35	0.94	0.38	1.02	0.42
Sledding	1.22	----	1.39	----	1.78	----	2.38	----
Attend Outdoor Concerts	0.60	0.40	0.75	0.50	0.95	0.63	1.12	0.74
Camping	0.32	0.19	0.45	0.27	0.59	0.35	0.68	0.41
Ice Skating	0.81	----	1.14	----	1.49	----	1.86	----
Horse-back Riding	0.52	0.20	0.58	0.23	0.68	0.27	0.78	0.30
Hiking	0.35	0.24	0.48	0.33	0.61	0.42	0.76	0.52
Water Skiing	0.12	0.11	0.19	0.17	0.27	0.24	0.38	0.34
Skiing	0.21	----	0.21	----	0.21	----	0.21	----
Canoeing	0.12	0.08	0.16	0.11	0.19	0.13	0.20	0.14
Sailing	0.16	0.06	0.21	0.07	0.27	0.10	0.34	0.12
Golf	1.05	0.53	1.38	0.69	1.88	0.94	2.20	1.10
Outdoor Games w/o Golf	16.15	4.93	21.30	6.51	25.18	7.65	29.80	9.06
Outdoor Games with Golf	17.20	5.46	22.68	7.20	27.06	8.59	32.00	10.16

Derived from NWP data for 1965, 1980, and 2000; projected straight-line to 2020. Summer rates derived by same ratio existing between annual and summer rates in ORRRC #19.

TABLE 21-64 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 1.1

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	2,637	2,294	3,649	3,164	5,299	4,593	7,300	6,328
	Beach (55%)*	1,450	1,262	2,007	1,740	2,914	2,526	4,015	3,480
	Picnicking	1,793	1,154	2,144	1,378	2,711	1,745	3,380	2,172
	Camping	369	226	558	342	850	624	1,196	735
	Nature Walking	344	84	408	102	512	128	630	156
	Hiking	135	81	201	119	291	177	433	261
	Sightseeing	1,591	650	2,060	841	2,822	1,151	3,776	1,541
	TOTAL ACTIVITY OCCASIONS	6,869	4,489	9,020	5,946	12,485	8,318	16,715	11,193
	TOTAL ACTIVITY OCCASIONS (55%)	5,682	3,457	7,378	4,522	10,100	6,251	13,430	8,345
	TOTAL RECREATION DAYS**	2,748	1,796	3,608	2,378	4,994	3,327	6,686	4,477
	TOTAL RECREATION DAYS (55%)	2,273	1,383	2,951	1,809	4,040	2,500	5,372	3,338
LAND-BASED OTHER	Playing Outdoor Games	4,391	1,463	6,226	2,072	9,810	3,263	14,109	4,517
	Golfing	693	344	969	484	1,538	772	2,130	1,063
	Bicycling	2,147	716	2,452	817	3,085	1,028	3,888	1,301
	Bicycling (25%) ***	537	179	613	204	771	257	972	325
	Horseback Riding	501	148	596	178	793	236	1,280	379
	Horseback Riding (25%)	125	37	149	47	198	59	320	95
	TOTAL ACTIVITY OCCASIONS	7,732	2,671	10,243	3,551	15,226	5,298	21,407	7,260
	TOTAL ACTIVITY OCCASIONS (25%)	5,746	2,023	7,957	2,807	12,317	4,351	17,531	6,000
	TOTAL RECREATION DAYS	3,093	1,068	4,097	1,420	6,090	2,119	8,563	2,904
	TOTAL RECREATION DAYS (25%)	2,298	809	3,183	1,123	4,927	1,740	7,012	2,400
WATER SURFACE	Boating	1,132	759	1,597	1,060	2,330	1,561	3,254	2,180
	Water Skiing	195	150	331	259	548	427	848	658
	Canoeing	81	38	104	56	149	79	217	119
	Sailing	42	31	58	41	87	62	120	85
	TOTAL ACTIVITY OCCASIONS	1,450	978	2,090	1,416	3,114	2,129	4,439	3,042
	TOTAL RECREATION DAYS	580	391	836	566	1,245	852	1,776	1,217
WINTER SPORTS	Skiing	73	-	78	-	87	-	86	-
	Sledding	494	-	599	-	880	-	1,277	-
	Ice Skating	321	-	487	-	730	-	1,041	-
	TOTAL ACTIVITY OCCASIONS	888	-	1,164	-	1,697	-	2,404	-
	TOTAL RECREATION DAYS	355	-	466	-	679	-	962	-
OTHER ACTIVITIES	Driving for Pleasure	3,983	1,552	4,950	1,861	6,144	2,308	7,492	2,815
	Walking for Pleasure	2,390	544	2,802	640	3,674	837	4,843	1,104
	Attending Outdoor Games	1,352	605	1,661	740	2,156	959	2,754	1,228
	Attending Outdoor Concerts	234	171	312	230	460	340	640	468
	TOTAL ACTIVITY OCCASIONS	7,959	2,872	9,725	3,471	12,434	4,444	15,729	5,615
	TOTAL RECREATION DAYS	3,184	1,149	3,890	1,388	4,974	1,778	6,292	2,246
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	24,898	-	32,242	-	44,956	-	60,694	-
	WATER-ORIENTED ACTIVITY OCCASIONS	7,132	-	9,468	-	13,212	-	17,870	-
	TOTAL RECREATION DAYS	9,959	-	12,897	-	17,982	-	24,278	-
	WATER-ORIENTED RECREATION DAYS	2,853	-	3,787	-	5,285	-	7,148	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–65 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 1.2

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	1,142	996	1,529	1,327	2,122	1,839	2,811	2,437
	Beach (55%)*	628	548	841	730	1,167	1,011	1,546	1,340
	Picnicking	692	448	797	513	966	622	1,218	782
	Camping	146	90	214	132	312	191	448	276
	Nature Walking	166	41	191	48	227	55	285	70
	Hiking	70	41	101	61	138	84	187	113
	Sightseeing	786	322	969	396	1,285	523	1,734	708
	TOTAL ACTIVITY OCCASIONS	3,002	1,938	3,801	2,477	5,050	3,314	6,683	4,386
	TOTAL ACTIVITY OCCASIONS (55%)	2,488	1,490	3,113	1,880	4,095	2,486	5,418	3,289
	TOTAL RECREATION DAYS**	1,201	775	1,520	991	2,020	1,326	2,673	1,754
	TOTAL RECREATION DAYS (55%)	995	596	1,245	752	1,638	994	2,167	1,316
LAND-BASED OTHER	Playing Outdoor Games	2,434	834	3,698	1,266	4,950	1,692	6,811	2,325
	Golfing	234	116	351	176	476	238	647	323
	Bicycling	1,074	359	1,177	393	1,414	473	1,769	592
	Bicycling (25%)***	269	90	294	98	354	118	442	148
	Horseback Riding	151	45	174	52	224	66	307	91
	Horseback Riding (25%)	38	11	44	13	56	17	77	23
	TOTAL ACTIVITY OCCASIONS	3,893	1,354	5,400	1,887	7,064	2,469	9,534	3,331
	TOTAL ACTIVITY OCCASIONS (25%)	2,975	1,051	4,387	1,553	5,836	2,065	7,977	2,819
	TOTAL RECREATION DAYS	1,557	542	2,160	755	2,826	988	3,814	1,332
	TOTAL RECREATION DAYS (25%)	1,190	420	1,754	621	2,334	826	3,191	1,128
WATER SURFACE	Boating	390	265	533	357	745	500	1,037	695
	Water Skiing	71	55	114	90	183	142	289	217
	Canoeing	26	15	38	20	51	27	70	37
	Sailing	23	16	30	21	42	30	63	44
	TOTAL ACTIVITY OCCASIONS	510	351	715	488	1,021	699	1,459	933
	TOTAL RECREATION DAYS	204	140	286	195	408	280	584	373
WINTER SPORTS	Skiing	40	-	39	-	44	-	50	-
	Sledding	198	-	232	-	327	-	471	-
	Ice Skating	184	-	231	-	330	-	475	-
	TOTAL ACTIVITY OCCASIONS	422	-	502	-	701	-	996	-
	TOTAL RECREATION DAYS	169	-	201	-	280	-	398	-
OTHER ACTIVITIES	Driving for Pleasure	1,762	665	2,045	768	2,424	912	2,954	1,112
	Walking for Pleasure	1,320	302	1,493	341	1,868	426	2,413	550
	Attending Outdoor Games	508	228	604	270	751	335	956	426
	Attending Outdoor Concerts	71	53	94	68	130	97	177	130
	TOTAL ACTIVITY OCCASIONS	3,661	1,248	4,236	1,448	5,173	1,770	6,500	2,218
	TOTAL RECREATION DAYS	1,464	499	1,694	579	2,069	708	2,600	887
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	11,488	-	14,654	-	19,009	-	25,172	-
	WATER-ORIENTED ACTIVITY OCCASIONS	2,998	-	3,828	-	5,116	-	6,877	-
	TOTAL RECREATION DAYS	4,595	-	5,862	-	7,604	-	10,069	-
	WATER-ORIENTED RECREATION DAYS	1,199	-	1,531	-	2,046	-	2,751	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-66 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 2.1

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	9,596	8,295	13,772	11,939	21,678	18,785	31,368	27,199
	Beach (55%)*	5,278	4,562	7,575	6,563	11,923	10,332	17,252	14,959
	Picnicking	5,728	3,707	7,135	4,582	9,811	6,309	13,547	8,704
	Camping	1,218	755	1,911	1,178	3,162	1,940	4,983	3,066
	Nature Walking	1,382	348	1,724	432	2,305	583	3,199	785
	Hiking	576	358	916	569	1,458	908	2,182	1,358
	Sightseeing	6,573	2,695	8,765	3,581	13,193	5,380	19,524	7,971
	TOTAL ACTIVITY OCCASIONS	25,073	16,158	34,223	22,281	51,607	33,905	74,803	49,083
	TOTAL ACTIVITY OCCASIONS (55%)	20,955	12,425	28,068	16,903	41,852	25,452	60,687	36,843
	TOTAL RECREATION DAYS**	10,029	6,463	13,689	8,912	20,643	13,562	29,291	19,633
	TOTAL RECREATION DAYS (55%)	8,302	4,970	11,227	6,761	16,741	10,181	24,271	14,737
LAND-BASED OTHER	Playing Outdoor Games	20,441	7,004	29,432	10,224	51,071	17,479	79,919	27,363
	Golfing	1,918	959	2,783	1,391	4,796	2,397	7,400	3,700
	Bicycling	8,932	3,004	10,648	3,550	14,522	4,853	19,906	6,659
	Bicycling (25%)***	2,233	751	2,662	888	3,630	1,213	4,976	1,665
	Horseback Riding	1,226	367	1,524	453	2,224	665	3,285	976
	Horseback Riding (25%)	307	92	381	113	556	166	821	244
	TOTAL ACTIVITY OCCASIONS	32,517	11,334	44,387	15,618	72,613	25,394	110,510	38,698
	TOTAL ACTIVITY OCCASIONS (25%)	24,899	8,806	35,258	12,616	60,053	21,255	93,116	32,972
	TOTAL RECREATION DAYS	13,007	4,534	17,755	6,247	29,045	10,158	44,204	15,479
	TOTAL RECREATION DAYS (25%)	9,960	3,522	14,103	5,046	24,021	8,502	37,246	13,189
WATER SURFACE	Boating	3,217	2,176	4,744	3,171	7,515	5,041	11,445	7,669
	Water Skiing	582	459	1,026	792	1,848	1,435	3,076	2,403
	Canoeing	217	121	329	180	511	283	768	410
	Sailing	190	134	271	195	436	302	722	511
	TOTAL ACTIVITY OCCASIONS	4,206	2,890	6,370	4,338	10,310	7,061	16,011	10,993
	TOTAL RECREATION DAYS	1,682	1,156	2,548	1,735	4,124	2,806	6,404	4,397
WINTER SPORTS	Skiing	331	-	356	-	450	-	575	-
	Sledding	1,643	-	2,073	-	3,332	-	5,247	-
	Ice Skating	1,369	-	2,134	-	3,521	-	5,489	-
	TOTAL ACTIVITY OCCASIONS	3,343	-	4,563	-	7,303	-	11,211	-
	TOTAL RECREATION DAYS	1,337	-	1,825	-	2,921	-	4,484	-
OTHER ACTIVITIES	Driving for Pleasure	14,659	5,554	18,391	6,909	24,747	9,301	32,754	12,421
	Walking for Pleasure	11,085	2,543	13,564	3,128	19,268	4,396	27,266	6,220
	Attending Outdoor Games	4,207	1,879	5,406	2,405	7,612	3,393	10,608	4,727
	Attending Outdoor Concerts	587	434	825	602	1,250	967	1,931	1,424
	TOTAL ACTIVITY OCCASIONS	30,538	10,410	38,186	13,044	52,877	18,057	72,559	24,792
	TOTAL RECREATION DAYS	12,215	4,164	15,274	5,218	21,151	7,223	29,024	9,917
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	95,677	-	127,729	-	194,710	-	285,094	-
	WATER-ORIENTED ACTIVITY OCCASIONS	24,961	-	34,438	-	52,162	-	76,698	-
	TOTAL RECREATION DAYS	38,270	-	51,091	-	77,884	-	114,037	-
	WATER-ORIENTED RECREATION DAYS	9,984	-	13,775	-	20,865	-	30,679	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–67 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 2.2

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	42,260	36,870	61,970	53,730	96,980	84,040	138,000	119,700
	Beach (55%)*	23,240	20,280	34,080	29,550	53,340	46,220	75,900	65,830
	Picnicking	25,420	16,450	32,050	20,580	43,810	28,370	59,550	38,260
	Camping	5,384	3,348	8,580	5,295	13,790	8,659	21,920	13,490
	Nature Walking	6,151	1,553	7,769	1,945	10,420	2,605	14,110	3,475
	Hiking	2,569	1,499	4,084	2,479	6,382	3,864	9,267	5,580
	Sightseeing	29,270	12,000	39,510	16,140	59,130	24,110	86,120	35,170
	TOTAL ACTIVITY OCCASIONS	111,054	71,720	153,963	100,169	230,512	151,448	328,967	215,675
	TOTAL ACTIVITY OCCASIONS (55%)	92,034	55,130	126,073	75,989	186,872	113,628	266,867	161,805
	TOTAL RECREATION DAYS**	44,422	28,688	61,585	40,068	92,205	60,579	131,587	86,270
	TOTAL RECREATION DAYS (55%)	36,814	22,052	50,429	30,396	74,749	45,451	106,747	64,722
LAND-BASED OTHER	Playing Outdoor Games	91,170	31,250	134,900	46,230	229,200	78,450	339,400	121,300
	Golfing	8,490	4,244	12,470	6,235	21,340	10,680	31,200	15,600
	Bicycling	39,780	13,380	48,110	16,000	65,090	21,750	87,810	29,380
	Bicycling (25%)***	9,940	3,340	12,030	4,000	16,270	5,440	21,950	7,340
	Horseback Riding	5,451	1,616	6,852	1,978	9,938	2,949	14,370	4,228
	Horseback Riding (25%)	1,365	404	1,713	495	2,485	737	3,590	1,057
	TOTAL ACTIVITY OCCASIONS	144,891	50,490	202,332	70,443	325,568	113,829	472,780	170,508
	TOTAL ACTIVITY OCCASIONS (25)	110,965	39,238	161,113	56,960	269,295	95,307	396,140	145,297
	TOTAL RECREATION DAYS	57,956	20,196	80,933	28,177	130,227	45,532	189,112	68,203
	TOTAL RECREATION DAYS (25%)	44,386	15,695	64,445	22,784	107,718	38,123	158,456	58,119
WATER SURFACE	Boating	14,740	9,635	21,270	14,220	33,490	22,470	50,200	33,650
	Water Skiing	2,573	2,031	4,562	3,556	8,244	6,394	13,500	10,420
	Canoeing	957	537	1,475	804	2,271	1,262	3,377	1,693
	Sailing	838	606	1,210	871	1,932	1,344	3,159	2,210
	TOTAL ACTIVITY OCCASIONS	19,108	12,809	28,517	19,451	45,937	31,470	70,236	47,973
	TOTAL RECREATION DAYS	7,643	5,124	11,407	7,780	18,375	12,588	28,094	19,189
WINTER SPORTS	Skiing	1,493	-	1,607	-	2,016	-	2,521	-
	Sledding	7,298	-	9,317	-	14,880	-	23,080	-
	Ice Skating	6,093	-	9,641	-	15,790	-	24,210	-
	TOTAL ACTIVITY OCCASIONS	14,884	-	20,565	-	32,686	-	49,811	-
	TOTAL RECREATION DAYS	5,954	-	8,226	-	13,074	-	19,924	-
OTHER ACTIVITIES	Driving for Pleasure	65,150	24,680	82,750	31,090	110,700	41,600	145,400	54,670
	Walking for Pleasure	49,430	11,340	61,240	13,990	86,470	19,780	120,400	27,470
	Attending Outdoor Games	18,660	8,375	24,270	10,800	33,980	15,140	46,600	20,770
	Attending Outdoor Concerts	2,575	1,918	3,693	2,686	5,809	4,294	8,446	6,230
	TOTAL ACTIVITY OCCASIONS	135,815	46,313	171,953	58,566	237,059	80,814	320,846	109,140
	TOTAL RECREATION DAYS	54,326	18,525	68,781	23,426	94,824	32,326	128,338	43,656
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	425,752	-	577,330	-	871,762	-	1,242,640	-
	WATER-ORIENTED ACTIVITY OCCASIONS	111,142	-	154,590	-	232,810	-	196,632	
	TOTAL RECREATION DAYS	170,301	-	230,932	-	348,705	-	497,055	-
	WATER-ORIENTED RECREATION DAYS	44,457	-	61,836	-	93,124	-	78,653	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-68 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 2.3

Annual Activity Occasions (in thousands)

	Activity	1970		1980		2000		2020	
		Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
LAND-BASED WATER ORIENTED	Swimming	19,693	17,185	29,171	25,292	46,627	40,405	67,910	58,888
	Beach (55%) *	10,831	9,452	16,044	13,911	25,645	22,223	37,350	32,388
	Picnicking	11,837	7,660	15,073	9,682	21,050	5,570	29,285	18,816
	Camping	2,506	1,560	4,036	2,491	6,787	4.161	10,779	6,633
	Nature Walking	2,868	724	3,658	915	5,010	1,252	6,945	1,710
	Hiking	1,198	724	1,923	1,167	3,070	1,858	4,561	2,747
	Sightseeing	13,645	5,597	18,604	7,599	28,441	11,594	42,394	17,310
	TOTAL ACTIVITY OCCASIONS	51,747	33,450	72,465	47,146	110,985	64,840	161,874	106,104
	TOTAL ACTIVITY OCCASIONS (55%)	42,885	25,717	59,338	35,765	90,003	46,658	131,314	79,604
	TOTAL RECREATION DAYS **	20,699	13,380	28,986	18,858	44,394	25,936	64,750	42,442
	TOTAL RECREATION DAYS (55%)	17,154	10,287	23,735	14,306	36,001	18,663	52,526	31,842
LAND-BASED OTHER	Playing Outdoor Games	22,946	8,186	33,516	11,886	54,091	19,188	82,924	29,438
	Golfing	3,956	1,978	5,864	2,932	10,264	5,132	15,346	7,673
	Bicycling	18,544	6,236	22,605	7,535	31,305	10,462	43,220	14,458
	Bicycling (25%)***	4,636	1,559	5,651	1,884	7,826	2,616	10,805	3,589
	Horseback Riding	2,535	753	3,218	946	4,769	1,415	7,051	2,074
	Horseback Riding (25%)	634	188	804	236	1,192	353	1,763	519
	TOTAL ACTIVITY OCCASIONS	47,981	17,153	65,203	23,299	100,429	36,716	148,541	53,643
	TOTAL ACTIVITY OCCASIONS (25%)	32,172	11,911	45,835	16,938	73,373	27,289	110,838	41,219
	TOTAL RECREATION DAYS	19,192	6,861	26,081	9,320	40,172	14,686	59,416	21,457
	TOTAL RECREATION DAYS (25%)	12,869	4,764	18,334	6,775	29,349	10,916	44,335	16,488
WATER SURFACE	Boating	6,628	4,484	9,996	6,686	16,081	10,788	24,672	16,535
	Water Skiing	1,198	947	2,144	1,671	3,959	3,070	6,634	5,183
	Canoeing	446	250	694	379	1,091	606	1,659	882
	Sailing	391	278	568	410	930	646	1,555	1,088
	TOTAL ACTIVITY OCCASIONS	8,663	5,959	13,402	9,146	22,061	15,110	34,520	23,688
	TOTAL RECREATION DAYS	3,465	2,384	5,361	3,658	8,824	6,044	13,808	9,475
WINTER SPORTS	Skiing	696	-	763	-	970	-	1,244	-
	Sledding	3,399	-	4,384	-	7,152	-	11,353	-
	Ice Skating	2,840	-	4,540	-	7,594	-	11,919	-
	TOTAL ACTIVITY OCCASIONS	6,935	-	9,687	-	15,716	-	24,516	-
	TOTAL RECREATION DAYS	2,774	-	3,875	-	6,286	-	9,806	-
OTHER ACTIVITIES	Driving for Pleasure	30,356	11,501	38,943	14,631	53,207	19,998	71,527	26,899
	Walking for Pleasure	23,059	5,292	28,852	6,590	41,611	9,494	59,294	13,528
	Attending Outdoor Games	8,690	3,899	11,415	5,077	16,323	7,272	22,910	10,211
	Attending Outdoor Concerts	1,199	891	1,736	1,262	2,789	2,062	4,148	3,059
	TOTAL ACTIVITY OCCASIONS	63,304	21,583	80,946	27,560	113,930	38,826	157,879	53,697
	TOTAL RECREATION DAYS	25,322	8,633	32,378	11,024	45,572	15,530	63,152	21,479
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	178,630	-	241,703	-	363,121	-	527,330	-
	WATER-ORIENTED ACTIVITY OCCASIONS	51,548	-	72,740	-	112,064	-	165,834	-
	TOTAL RECREATION DAYS	71,452	-	96,681	-	145,248	-	210,932	-
	WATER-ORIENTED RECREATION DAYS	20,619	-	29,096	-	44,826	-	66,334	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–69 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 2.4

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2020 Annual	2020 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	5,019	4,381	7,367	6,387	11,647	10,094	16,854	14,616
	Beach (55%)*	2,760	2,410	4,052	3,513	6,406	5,552	9,270	8,039
	Picnicking	3,018	1,952	3,807	2,445	5,259	3,382	7,269	4,670
	Camping	639	398	1,019	629	1,696	1,039	2,677	1,648
	Nature Walking	730	184	923	232	1,252	312	1,724	1,260
	Hiking	305	184	486	295	767	464	1,132	682
	Sightseeing	3,479	1,426	4,699	1,920	7,106	2,897	10,523	4,297
	TOTAL ACTIVITY OCCASIONS	13,190	8,525	18,301	11,908	27,727	18,188	40,179	27,173
	TOTAL ACTIVITY OCCASIONS (55%)	10,931	6,554	14,986	9,034	22,486	13,646	32,595	20,596
	TOTAL RECREATION DAYS**	5,276	3,410	7,320	4,763	11,091	7,275	16,072	10,869
	TOTAL RECREATION DAYS (55%)	4,372	2,622	5,994	3,614	8,994	5,458	13,038	8,238
LAND-BASED OTHER	Playing Outdoor Games	5,850	2,088	8,466	3,002	13,514	4,795	20,585	7,307
	Golfing	1,007	504	1,354	677	2,564	1,282	3,808	1,904
	Bicycling	4,728	1,591	5,709	1,904	7,823	2,615	10,731	3,589
	Bicycling (25%)***	1,182	398	1,427	476	1,956	654	2,683	897
	Horseback Riding	645	192	812	238	1,191	353	1,750	514
	Horseback Riding (25%)	161	48	203	60	298	88	438	128
	TOTAL ACTIVITY OCCASIONS	12,230	4,821	16,341	5,821	25,092	9,045	36,874	13,314
	TOTAL ACTIVITY OCCASIONS (25%)	8,200	3,038	11,450	4,215	18,332	6,819	27,514	10,236
	TOTAL RECREATION DAYS	4,892	1,928	6,536	2,328	10,037	3,618	14,750	5,326
	TOTAL RECREATION DAYS (25%)	3,280	1,215	4,580	1,686	7,333	2,728	11,006	4,094
WATER SURFACE	Boating	1,690	1,143	2,525	1,689	4,019	2,695	6,124	4,104
	Water Skiing	305	242	541	364	989	767	1,648	1,287
	Canoeing	113	63	175	96	273	151	412	218
	Sailing	99	71	143	104	232	162	386	270
	TOTAL ACTIVITY OCCASIONS	2,207	1,519	3,384	2,253	5,513	3,775	8,570	5,879
	TOTAL RECREATION DAYS	883	608	1,354	901	2,205	1,510	3,428	2,352
WINTER SPORTS	Skiing	178	-	191	-	243	-	308	-
	Sledding	867	-	1,107	-	1,787	-	2,818	-
	Ice Skating	724	-	1,146	-	1,898	-	2,959	-
	TOTAL ACTIVITY OCCASIONS	1,769	-	2,444	-	3,928	-	6,085	-
	TOTAL RECREATION DAYS	708	-	978	-	1,571	-	2,434	-
OTHER ACTIVITIES	Driving for Pleasure	7,739	2,931	9,835	3,695	13,293	4,996	17,755	6,678
	Walking for Pleasure	5,879	1,349	7,287	1,663	10,396	2,372	14,717	3,358
	Attending Outdoor Games	2,215	994	2,884	1,283	4,078	1,817	5,687	2,534
	Attending Outdoor Concerts	305	227	439	319	696	515	1,030	759
	TOTAL ACTIVITY OCCASIONS	16,138	5,501	20,445	6,960	28,463	9,700	39,189	13,329
	TOTAL RECREATION DAYS	6,455	2,200	8,178	2,784	11,385	3,880	15,676	5,332
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	45,535	-	60,915	-	90,722	-	130,900	-
	WATER-ORIENTED ACTIVITY OCCASIONS	13,138	-	18,370	-	27,998	-	41,165	-
	TOTAL RECREATION DAYS	18,214	-	24,366	-	36,289	-	52,360	-
	WATER-ORIENTED RECREATION DAYS	5,255	-	7,348	-	11,199	-	16,466	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-70 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 3.1

Annual Activity Occasions (in thousands)

		1970		1980		2000		2020	
		Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
LAND-BASED WATER ORIENTED	Swimming	1,910	1,670	2,805	2,432	4,409	3,820	6,343	5,550
	Beach (55%)*	1,050	918	1,543	1,338	2,425	2,101	3,489	3,025
	Picnicking	1,150	743	1,448	930	1,990	1,280	2,735	1,758
	Camping	244	152	388	240	641	393	1,007	620
	Nature Walking	278	70	352	88	474	119	649	160
	Hiking	116	70	185	112	290	175	427	257
	Sightseeing	1,325	544	1,790	731	2,690	1,095	3,960	1,616
	TOTAL ACTIVITY OCCASIONS	5,023	3,249	6,968	4,533	10,494	6,882	15,121	9,911
	TOTAL ACTIVITY OCCASIONS (55%)	4,163	2,497	5,706	3,439	8,510	5,163	12,267	7,436
	TOTAL RECREATION DAYS **	2,009	1,300	2,787	1,813	4,198	2,753	6,048	3,964
	TOTAL RECREATION DAYS (55%)	1,649	999	2,282	1,376	3,404	2,065	4,907	2,974
LAND-BASED OTHER	Playing Outdoor Games	4,129	1,414	6,106	2,092	10,421	3,567	12,474	5,344
	Golfing	385	193	563	282	969	485	1,432	716
	Bicycling	1,802	606	2,174	725	2,960	989	4,037	1,350
	Bicycling (25%) ***	450	152	544	181	740	247	1,009	338
	Horseback Riding	246	74	309	91	451	134	658	194
	Horseback Riding (25%)	62	18	77	23	113	34	164	48
	TOTAL ACTIVITY OCCASIONS	6,562	2,287	9,152	3,190	14,801	5,175	18,601	7,604
	TOTAL ACTIVITY OCCASIONS (25%)	5,026	1,777	7,290	2,578	12,243	4,333	15,079	6,446
	TOTAL RECREATION DAYS	2,625	915	3,661	1,276	5,920	2,070	7,440	3,042
	TOTAL RECREATION DAYS (25%)	2,010	711	2,916	1,031	4,897	1,733	6,032	2,578
WATER SURFACE	Boating	644	436	961	642	1,520	1,020	2,303	1,544
	Water Skiing	116	92	206	161	375	290	620	485
	Canoeing	43	24	67	36	103	58	155	82
	Sailing	38	27	55	39	87	62	145	102
	TOTAL ACTIVITY OCCASIONS	841	579	1,289	878	2,085	1,430	3,223	2,213
	TOTAL RECREATION DAYS	336	232	516	351	834	572	1,289	885
WINTER SPORTS	Skiing	68	-	73	-	92	-	116	-
	Sledding	330	-	421	-	676	-	1,060	-
	Ice Skating	276	-	436	-	718	-	1,114	-
	TOTAL ACTIVITY OCCASIONS	674	-	930	-	1,486	-	2,290	-
	TOTAL RECREATION DAYS	270	-	372	-	594	-	916	-
OTHER ACTIVITIES	Driving for Pleasure	2,950	1,117	3,744	1,406	5,031	1,890	6,680	2,511
	Walking for Pleasure	2,240	514	2,774	633	3,934	898	5,539	1,264
	Attending Outdoor Games	843	379	1,098	488	1,542	687	2,139	953
	Attending Outdoor Concerts	116	87	167	121	263	195	387	286
	TOTAL ACTIVITY OCCASIONS	6,149	2,097	7,783	2,648	10,770	3,670	14,745	5,014
	TOTAL RECREATION DAYS	2,460	839	3,113	1,059	4,308	1,468	5,898	2,006
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	19,249	-	26,122	-	39,635	-	53,978	-
	WATER-ORIENTED ACTIVITY OCCASIONS	4,962	-	6,995	-	10,595	-	15,490	-
	TOTAL RECREATION DAYS	7,700	-	10,449	-	15,854	-	21,591	-
	WATER-ORIENTED RECREATION DAYS	1,985	-	2,798	-	4,238	-	6,196	-

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**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–71 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 3.2

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	7,760	6,772	11,481	9,954	18,151	15,728	26,257	22,767
	Beach (55%)	4,268	3,725	6,315	5,475	9,983	8,650	14,441	12,522
	Picnicking	4,655	3,014	5,920	3,804	8,179	5,261	11,301	7,264
	Camping	985	612	1,582	977	2,634	1,617	4,154	2,557
	Nature Walking	1,128	286	1,437	361	1,947	487	2,680	661
	Hiking	472	285	756	460	1,194	723	1,761	1,061
	Sightseeing	5,372	2,204	7,314	2,988	11,060	4,503	16,372	6,684
	TOTAL ACTIVITY OCCASIONS	20,372	13,173	28,490	18,544	43,165	28,324	62,525	40,994
	TOTAL ACTIVITY OCCASIONS (55%)	16,880	10,126	23,324	14,065	35,997	21,246	50,709	30,749
	TOTAL RECREATION DAYS**	8,149	5,269	11,396	7,418	17,266	11,330	25,010	16,398
	TOTAL RECREATION DAYS (55%)	6,752	4,050	9,330	5,626	14,399	8,493	20,284	12,300
LAND-BASED OTHER	Playing Outdoor Games	16,730	5,734	24,970	8,554	42,863	14,676	64,501	22,102
	Golf	1,557	778	2,306	1,154	3,991	1,990	5,927	2,940
	Bicycling	7,289	2,451	8,876	2,957	12,158	4,062	16,672	5,575
	Bicycling (25%) ***	1,822	613	2,219	739	3,040	1,015	4,166	1,394
	Horseback Riding	995	296	1,263	371	1,851	550	2,719	800
	Horseback Riding (25%)	249	74	316	93	463	138	680	200
	TOTAL ACTIVITY OCCASIONS	26,571	9,259	37,415	13,036	60,863	21,278	89,819	31,417
	TOTAL ACTIVITY OCCASIONS (25%)	20,358	7,199	29,811	10,540	50,357	17,819	75,274	26,636
	TOTAL RECREATION DAYS	10,628	3,704	14,966	5,214	24,345	8,511	35,928	12,567
	TOTAL RECREATION DAYS (25%)	8,143	2,880	11,924	4,216	20,143	7,128	30,110	10,654
WATER SURFACE	Boating	2,604	1,763	3,922	2,624	6,242	4,189	9,514	6,378
	Water Skiing	471	372	841	656	1,536	1,192	2,557	1,997
	Canoeing	175	100	273	149	424	236	640	341
	Sailing	154	109	224	181	362	251	601	420
	TOTAL ACTIVITY OCCASIONS	3,404	2,344	5,260	3,610	8,564	5,868	13,312	9,136
	TOTAL RECREATION DAYS	1,362	938	2,104	1,444	3,426	2,347	5,325	3,654
WINTER SPORTS	Skiing	274	-	297	-	377	-	480	-
	Sledding	1,337	-	1,723	-	2,781	-	4,385	-
	Ice Skating	1,117	-	1,783	-	2,952	-	4,602	-
	TOTAL ACTIVITY OCCASIONS	2,728	-	3,803	-	6,110	-	9,467	-
	TOTAL RECREATION DAYS	1,091	-	1,521	-	2,444	-	3,787	-
OTHER ACTIVITIES	Driving for Pleasure	11,943	4,524	15,304	5,747	20,684	7,772	27,613	10,382
	Walking for Pleasure	9,086	2,087	11,356	2,597	16,199	3,699	22,925	6,234
	Attending Outdoor Games	3,418	1,533	4,484	1,993	6,341	2,824	8,840	3,939
	Attending Outdoor Concerts	471	351	683	497	1,086	802	1,604	1,182
	TOTAL ACTIVITY OCCASIONS	24,918	8,495	31,827	10,834	44,310	15,097	60,982	21,737
	TOTAL RECREATION DAYS	9,967	3,398	12,731	4,334	17,724	6,039	24,393	8,695
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	77,992	-	106,795	-	163,012	-	236,108	-
	WATER-ORIENTED ACTIVITY OCCASIONS	20,285	-	28,585	-	44,562	-	64,022	-
	TOTAL RECREATION DAYS	31,197	-	42,718	-	65,205	-	94,443	-
	WATER-ORIENTED RECREATION DAYS	8,114	-	11,434	-	17,825	-	25,609	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

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****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–72 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 4.1

Annual Activity Occasions (in thousands)

		1970		1980		2000		2020	
		Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
LAND-BASED WATER ORIENTED	Swimming	21,106	18,418	31,306	27,387	50,287	43,577	73,121	63,408
	Beach (55%) *	11,608	10,130	17,218	15,063	27,658	23,967	40,217	34,874
	Picnicking	12,714	8,210	16,322	10,482	22,702	14,598	31,536	20,261
	Camping	2,686	1,672	4,371	2,697	7,321	4,136	11,608	7,144
	Nature Walking	3,075	776	3,961	990	5,403	1,351	7,479	1,841
	Hiking	1,284	776	2,083	1,264	3,312	2,005	4,912	2,959
	Sightseeing	14,627	6,000	20,147	8,231	30,678	12,506	45,657	15,285
	TOTAL ACTIVITY OCCASIONS	55,492	35,852	78,190	51,051	119,703	78,173	174,313	110,898
	TOTAL ACTIVITY OCCASIONS (55%)	45,994	27,544	64,102	38,727	97,074	58,563	141,409	82,364
	TOTAL RECREATION DAYS**	22,197	14,341	31,276	20,420	47,881	31,269	69,725	44,359
	TOTAL RECREATION DAYS (55%)	18,398	11,018	25,640	15,491	38,830	23,425	56,564	32,946
LAND-BASED OTHER	Playing Outdoor Games	45,552	15,611	68,774	23,563	118,874	40,700	179,839	61,621
	Golfing	4,239	2,119	6,350	3,176	11,068	5,484	16,071	8,036
	Bicycling	19,880	6,680	24,283	8,161	33,770	11,286	46,767	14,672
	Bicycling (25%) ***	4,970	1,671	6,071	2,040	8,442	2,821	11,692	3,668
	Horseback Riding	2,716	806	3,483	1,025	5,142	1,525	7,590	2,233
	Horseback Riding (25%)	679	202	871	256	1,285	381	1,898	558
	TOTAL ACTIVITY OCCASIONS	72,387	25,222	102,890	35,925	168,854	58,995	250,267	86,562
	TOTAL ACTIVITY OCCASIONS (25%)	55,440	19,603	82,066	29,035	139,645	49,386	209,500	73,883
	TOTAL RECREATION DAYS	28,954	10,089	41,156	14,370	67,542	23,598	100,107	34,625
	TOTAL RECREATION DAYS (25%)	22,176	7,841	32,826	11,614	55,868	19,754	83,800	29,553
WATER SURFACE	Boating	7,105	4,806	10,824	7,240	17,343	11,634	26,568	17,804
	Water Skiing	1,284	1,015	2,321	1,810	4,270	3,312	7,144	5,581
	Canoeing	470	272	752	410	1,176	654	1,787	949
	Sailing	419	299	614	443	1,002	697	1,674	1,173
	TOTAL ACTIVITY OCCASIONS	9,278	6,392	14,511	9,903	23,791	16,297	37,173	25,507
	TOTAL RECREATION DAYS	3,711	2,557	5,804	3,961	9,516	6,519	14,869	10,203
WINTER SPORTS	Skiing	747	-	820	-	1,046	-	1,340	-
	Sledding	3,641	-	4,747	-	7,712	-	12,223	-
	Ice Skating	3,045	-	4,916	-	8,192	-	12,837	-
	TOTAL ACTIVITY OCCASIONS	7,433	-	10,483	-	16,950	-	26,400	-
	TOTAL RECREATION DAYS	2,973	-	4,193	-	6,780	-	10,560	-
OTHER ACTIVITIES	Driving for Pleasure	32,587	8,950	42,172	15,844	57,389	21,570	77,024	28,967
	Walking for Pleasure	24,718	5,672	31,246	7,137	44,884	10,242	63,856	14,569
	Attending Outdoor Games	9,313	4,179	12,361	5,498	17,604	10,964	26,235	16,605
	Attending Outdoor Concerts	1,284	955	1,878	1,366	3,007	2,222	4,465	3,293
	TOTAL ACTIVITY OCCASIONS	67,902	19,756	87,657	29,845	122,884	44,998	171,580	63,434
	TOTAL RECREATION DAYS	27,161	7,902	35,063	11,938	49,154	17,999	68,632	25,374
	PLANNING AREA TOTALS: ****								
	TOTAL ACTIVITY OCCASIONS	213,495	-	293,730	-	452,182		659,732	
	WATER-ORIENTED ACTIVITY OCCASIONS	53,428	-	78,610	-	120,865	-	178,582	
	TOTAL RECREATION DAYS	85,398	-	117,492	-	180,873	-	263,893	
	WATER-ORIENTED RECREATION DAYS	21,371	-	31,444	-	48,346	-	71,433	

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–73 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 4.2

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	11,558	10.082	17,113	14,833	27,343	23,688	39,842	34,541
	Beach (55%)*	6,357	5,545	9,412	8,158	15,039	13,028	21,913	18,998
	Picnicking	6,889	4,467	8,771	5,645	12,252	7,892	17,043	10,968
	Camping	1,448	900	2,332	1,440	3,926	2,406	6,236	3,837
	Nature Walking	1,669	425	2,128	536	2,915	734	4,042	1,003
	Hiking	697	423	1,120	680	1,788	1,084	2,658	1,604
	Sightseeing	7,969	3,266	10,864	4,435	16,607	6,765	24,740	10,096
	TOTAL ACTIVITY OCCASIONS	30,230	19,563	42,328	27,569	64,831	42,569	94,561	62,049
	TOTAL ACTIVITY OCCASIONS (55%)	25,029	15,026	34,627	20,894	52,527	31,909	76,632	46,506
	TOTAL RECREATION DAYS **	12,092	7,825	16,931	11,028	25,932	17,028	37,824	24,820
	TOTAL RECREATION DAYS (55%)	10,012	6,010	13,851	8,358	21,011	12,764	30,653	18,602
LAND-BASED OTHER	Playing Outdoor Games	24,031	8,216	35,919	12,286	62,304	21,311	94,382	32,299
	Golfing	2,310	1,155	3,426	1,713	5,992	2,996	8,960	4,480
	Bicycling	10,763	3,613	13,119	4,366	18,179	6,065	25,106	8,385
	Bicycling (25%)***	2,691	903	3,280	1,092	4,545	1,516	6,276	2,096
	Horseback Riding	1,470	437	1,865	551	2,766	823	4,092	1,206
	Horseback Riding (25%)	368	109	466	138	692	206	1,023	302
	TOTAL ACTIVITY OCCASIONS	38,574	13,421	54,329	18,916	89,241	31,195	132,540	46,370
	TOTAL ACTIVITY OCCASIONS (25%)	29,400	10,383	43,091	15,229	73,533	26,029	110,641	39,177
	TOTAL RECREATION DAYS	15,430	5,368	21,732	7,566	35,696	12,478	53,016	18,548
	TOTAL RECREATION DAYS (25%)	11,760	4,153	17,236	6,092	29,413	10,412	44,256	15,671
WATER SURFACE	Boating	3,842	2,603	5,794	3,881	9,326	6,266	14,315	9,607
	Water Skiing	691	547	1,238	965	2,287	1,774	3,836	2,999
	Canoeing	259	146	403	221	634	353	1,054	514
	Sailing	229	162	332	238	545	375	910	632
	TOTAL ACTIVITY OCCASIONS	5,021	3,458	7,767	5,305	12,792	8,768	20,115	13,752
	TOTAL RECREATION DAYS	2,008	1,383	3,107	2,122	5,117	3,507	8,046	5,501
WINTER SPORTS	Skiing	406	-	441	-	565	-	725	-
	Sledding	1,985	--	2,560	-	4,177	-	6,638	-
	Ice Skating	1,654	-	2,643	-	4,423	-	6,943	-
	TOTAL ACTIVITY OCCASIONS	4,045	-	5,644	-	9,165	-	14,306	-
	TOTAL RECREATION DAYS	1,618	-	2,258	-	3,666	-	5,722	-
OTHER ACTIVITIES	Driving for Pleasure	17,697	6,694	22,698	8,515	31,018	11,643	41,695	15,662
	Walking for Pleasure	13,529	3,114	16,919	3,876	24,396	5,582	34,763	7,953
	Attending Outdoor Games	5,056	2,263	6,641	2,946	9,500	4,223	13,334	5,930
	Attending Outdoor Concerts	705	523	1,019	740	1,637	1,208	2,435	1,793
	TOTAL ACTIVITY OCCASIONS	36,987	12,594	47,277	16,077	66,551	22,656	92,227	31,338
	TOTAL RECREATION DAYS	14,795	5,038	18,911	6,431	26,620	9,062	36,891	12,535
	PLANNING AREA TOTALS:***								
	TOTAL ACTIVITY OCCASIONS	114,858	-	157,318	-	242,578	-	353,748	-
	WATER ORIENTED ACTIVITY OCCASIONS	30,048	-	42,368	-	65,318	-	96,748	-
	TOTAL RECREATION DAYS	45,943	-	62,927	-	97,031	-	141,499	-
	WATER-ORIENTED RECREATION DAYS	12,019	-	16,947	-	26,127	-	38,699	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-74 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 4.3

Annual Activity Occasions (in thousands)

		1970		1980		2000		2020	
		Annual	Summer	Annual	Summer	Annual	Summer	Annual	Summer
LAND-BASED WATER ORIENTED	Swimming	14,670	12,799	21,238	18,408	32,835	28,448	46,886	40,650
	Beach (55%)*	8,068	7,039	11,681	10,124	18,059	15,646	25,787	22,357
	Picnicking	8,766	5,680	10,910	7,018	14,739	9,492	20,090	12,925
	Camping	1,847	1,149	2,906	1,794	4,729	2,900	7,360	4,529
	Nature Walking	2,123	539	2,647	666	3,507	881	4,765	1,181
	Hiking	887	537	1,392	846	2,149	1,303	3,133	1,889
	Sightseeing	10,131	4,154	13,501	5,511	19,964	8,135	29,148	11,896
	TOTAL ACTIVITY OCCASIONS	38,424	22,858	52,594	34,243	77,923	51,159	111,382	73,070
	TOTAL ACTIVITY OCCASIONS (55%)	31,822	19,098	43,037	25,959	63,147	38,357	90,283	54,776
	TOTAL RECREATION DAYS**	15,370	9,143	21,038	13,697	31,169	20,464	44,553	29,228
	TOTAL RECREATION DAYS (55%)	12,729	7,639	17,215	10,384	25,259	15,343	36,113	21,910
LAND-BASED OTHER	Playing Outdoor Games	31,557	10,815	46,100	15,794	77,366	26,488	114,896	39,369
	Golfing	2,936	1,468	4,258	2,128	7,204	3,602	10,555	5,278
	Bicycling	13,709	4,604	16,332	5,437	21,645	7,304	29,607	9,892
	Bicycling (25%) ***	3,427	1,151	4,083	1,359	5,411	1,826	7,402	2,473
	Horseback Riding	1,872	557	2,321	685	3,330	991	4,826	1,423
	Horseback Riding (25%)	468	139	580	171	832	248	1,206	356
	TOTAL ACTIVITY OCCASIONS	50,074	17,444	69,011	24,044	109,545	38,385	159,884	55,962
	TOTAL ACTIVITY OCCASIONS (25%)	38,388	13,573	55,021	19,452	90,813	32,164	134,059	47,476
	TOTAL RECREATION DAYS	20,030	6,978	27,604	9,618	43,818	15,354	63,954	22,385
	TOTAL RECREATION DAYS (25%)	15,355	5,429	22,008	7,817	36,325	12,866	53,624	18,990
WATER SURFACE	Boating	4,896	3,314	7,215	4,831	11,229	7,541	16,886	11,328
	Water Skiing	881	697	1,543	1,203	2,756	2,138	4,528	3,539
	Canoeing	330	186	502	275	763	425	1,136	605
	Sailing	290	206	413	296	654	451	1,081	745
	TOTAL ACTIVITY OCCASIONS	6,397	4,403	9,673	6,605	15,402	10,555	23,631	16,217
	TOTAL RECREATION DAYS	2,559	1,761	3,869	2,642	6,161	4,222	9,452	6,487
WINTER SPORTS	Skiing	516	-	549	-	680	-	854	-
	Sledding	2,524	-	3,182	-	5,021	-	7,817	-
	Ice Skating	2,104	-	3,287	-	5,319	-	8,183	-
	TOTAL ACTIVITY OCCASIONS	5,144	-	7,018	-	11,021	-	16,854	-
	TOTAL RECREATION DAYS	2,058	-	2,807	-	4,408	-	6,742	-
OTHER ACTIVITIES	Driving for Pleasure	22,509	8,159	28,221	10,592	37,302	14,007	49,133	18,461
	Walking for Pleasure	17,174	3,949	21,000	4,807	29,298	6,700	40,917	9,355
	Attending Outdoor Games	6,435	2,883	8,261	3,667	11,428	5,082	15,717	6,994
	Attending Outdoor Concerts	893	663	1,265	1,018	1,966	1,451	2,865	2,109
	TOTAL ACTIVITY OCCASIONS	47,011	16,014	58,747	20,084	79,994	27,240	108,632	36,919
	TOTAL RECREATION DAYS	18,804	6,406	23,498	8,034	31,998	10,896	43,453	14,768
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	147,052	-	197,040	-	293,885	-	420,385	-
	WATER-ORIENTED ACTIVITY OCCASIONS	38,070	-	52,710	-	78,550	-	113,912	-
	TOTAL RECREATION DAYS	58,821	-	78,816	-	117,554	-	168,154	-
	WATER-ORIENTED RECREATION DAYS	15,228	-	21,084	-	31,420	-	45,565	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21–75 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 4.4

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	6,929	6,046	9,928	8,607	15,064	13,052	21,007	18,195
	Beach (55%) *	3,811	3,325	5,460	4,734	8,285	7,179	11,554	10,007
	Picnicking	4,147	2,686	5,105	3,284	6,768	4,358	8,999	5,789
	Camping	874	545	1,362	840	2,173	1,331	3,298	2,030
	Nature Walking	1,005	255	1,239	311	1,611	404	2,134	529
	Hiking	420	254	651	395	989	598	1,403	845
	Sightseeing	4,795	1,964	6,315	2,583	9,164	3,733	13,054	5,328
	TOTAL ACTIVITY OCCASIONS	18,170	11,750	24,601	16,020	35,769	23,476	49,895	32,716
	TOTAL ACTIVITY OCCASIONS (55%)	15,052	9,029	20,133	12,147	28,990	17,603	40,442	24,528
	TOTAL RECREATION DAYS**	7,268	4,700	9,840	6,408	14,308	9,390	19,958	13,086
	TOTAL RECREATION DAYS (55%)	6,021	3,612	8,053	4,859	11,596	7,041	16,177	9,811
LAND-BASED OTHER	Playing Outdoor Games	14,930	5,111	21,572	7,382	35,488	12,138	51,407	17,596
	Golfing	1,386	693	1,985	993	3,298	1,649	4,713	2,356
	Bicycling	6,489	2,180	7,601	2,547	10,052	3,356	13,265	4,432
	Bicycling (25%)***	1,622	545	1,900	637	2,513	839	3,316	1,108
	Horseback Riding	888	264	1,088	321	1,530	454	2,162	638
	Horseback Riding (25%)	222	66	272	80	382	114	541	159
	TOTAL ACTIVITY OCCASIONS	23,693	8,248	32,246	11,243	50,368	17,597	71,547	25,022
	TOTAL ACTIVITY OCCASIONS (25%)	18,160	6,415	25,729	9,092	41,681	14,740	59,977	21,219
	TOTAL RECREATION DAYS	9,477	3,299	12,898	4,497	20,147	7,039	28,619	10,009
	TOTAL RECREATION DAYS (25%)	7,264	2,566	10,292	3,637	16,672	5,896	23,990	8,488
WATER SURFACE	Boating	2,318	1,568	3,379	2,211	5,158	3,463	7,568	5,076
	Water Skiing	418	331	723	564	1,266	984	2,031	1,586
	Canoeing	156	88	235	128	350	196	509	271
	Sailing	139	97	192	139	301	208	479	334
	TOTAL ACTIVITY OCCASIONS	3,031	2,084	4,529	3,042	7,075	4,851	10,587	7,267
	TOTAL RECREATION DAYS	1,212	834	1,812	1,217	2,830	1,940	4,235	2,907
WINTER SPORTS	Skiing	244	-	257	-	311	-	382	-
	Sledding	1,193	-	1,491	-	2,305	-	3,499	-
	Ice Skating	995	-	1,538	-	2,343	-	3,664	-
	TOTAL ACTIVITY OCCASIONS	2,432	-	3,286	-	4,959	-	7,545	-
	TOTAL RECREATION DAYS	973	-	1,314	-	1,984	-	3,018	-
OTHER ACTIVITIES	Driving for Pleasure	10,644	4,029	13,207	4,958	17,126	6,431	22,006	8,268
	Walking for Pleasure	8,114	1,865	9,816	2,246	13,442	3,073	18,316	4,156
	Attending Outdoor Games	3,044	1,364	3,866	1,717	5,247	2,334	7,041	3,134
	Attending Outdoor Concerts	422	314	591	429	902	665	1,283	945
	TOTAL ACTIVITY OCCASIONS	22,224	7,572	27,480	9,350	36,717	12,503	48,646	16,503
	TOTAL RECREATION DAYS	8,890	3,029	10,992	3,740	14,687	5,001	19,458	6,601
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	69,550	-	92,140	-	134,890	-	188,220	-
	WATER-ORIENTED ACTIVITY OCCASIONS	18,082	-	24,662	-	36,065	-	51,030	-
	TOTAL RECREATION DAYS	27,820	-	36,856	-	53,956	-	75,288	-
	WATER-ORIENTED RECREATION DAYS	7,233	-	9,865	-	14,426	-	20,412	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-76 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 5.1

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	6,079	5,298	8,791	7,615	13,613	11,786	19,299	16,719
	Beach (55%)*	3,343	2,914	4,835	4,188	7,487	6,482	10,614	9,195
	Picnicking	3,560	2,318	4,425	2,861	5,984	3,873	8,067	5,217
	Camping	736	459	1,159	715	1,885	1,155	2,844	1,785
	Nature Walking	862	223	1,073	275	1,423	364	1,914	485
	Hiking	362	220	564	345	874	532	1,264	767
	Sightseeing	4,147	1,696	5,525	2,252	8,175	3,325	11,800	4,807
	TOTAL ACTIVITY OCCASIONS	15,746	10,214	21,537	14,063	31,954	21,035	45,188	29,780
	TOTAL ACTIVITY OCCASIONS (55%)	13,010	7,830	17,581	10,636	25,828	15,731	36,503	22,256
	TOTAL RECREATION DAYS **	6,298	4,086	8,615	5,625	12,782	8,414	18,075	11,912
	TOTAL RECREATION DAYS (55%)	5,204	3,132	7,032	4,254	10,331	6,292	14,601	8,902
LAND-BASED OTHER	Playing Outdoor Games	6,959	2,470	9,923	3,501	15,513	5,474	23,076	8,860
	Golfing	1,188	595	1,722	860	2,917	1,458	4,230	2,115
	Bicycling	5,529	1,849	6,578	2,181	8,365	2,927	11,815	3,927
	Bicycling (25%)***	1,382	462	1,644	545	2,091	732	2,954	982
	Horseback Riding	753	226	934	278	1,341	402	1,923	571
	Horseback Riding (25%)	188	56	234	70	335	100	481	143
	TOTAL ACTIVITY OCCASIONS	14,429	5,140	19,157	6,820	28,136	10,261	41,044	15,473
	TOTAL ACTIVITY OCCASIONS (25%)	9,717	3,583	13,523	4,976	20,856	7,764	30,741	12,100
	TOTAL RECREATION DAYS	5,772	2,056	7,663	2,728	11,254	4,104	16,418	6,189
	TOTAL RECREATION DAYS (25%)	3,887	1,433	5,409	1,999	8,342	3,106	12,296	4,840
WATER SURFACE	Boating	1,970	1,337	2,899	1,948	4,514	3,043	6,720	4,521
	Water Skiing	351	278	614	479	1,095	851	1,783	1,396
	Canoeing	134	77	203	112	309	172	453	244
	Sailing	119	83	171	120	270	182	438	297
	TOTAL ACTIVITY OCCASIONS	2,574	1,775	3,887	2,659	6,188	4,248	9,394	6,458
	TOTAL RECREATION DAYS	1,030	710	1,555	1,064	2,475	1,699	3,758	2,583
WINTER SPORTS	Skiing	210	-	224	-	277	-	344	-
	Sledding	1,035	-	1,304	-	2,058	-	3,183	-
	Ice Skating	856	-	1,335	-	2,161	-	3,294	-
	TOTAL ACTIVITY OCCASIONS	2,101	-	2,863	-	4,496	-	6,821	-
	TOTAL RECREATION DAYS	840	-	1,145	-	1,798	-	2,728	-
OTHER ACTIVITIES	Driving for Pleasure	9,178	3,461	11,493	4,299	15,210	5,690	19,828	7,399
	Walking for Pleasure	7,106	1,647	8,683	2,002	12,104	2,796	16,798	3,872
	Attending Outdoor Games	2,613	1,162	3,349	1,477	4,638	2,049	6,311	2,790
	Attending Outdoor Concerts	373	275	526	380	818	601	1,182	862
	TOTAL ACTIVITY OCCASIONS	19,270	6,545	24,051	8,158	32,770	11,136	44,119	14,923
	TOTAL RECREATION DAYS	7,708	2,618	9,620	3,263	13,108	4,454	17,648	5,969
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	54,120	-	71,495	-	103,542	-	146,568	-
	WATER-ORIENTED ACTIVITY OCCASIONS	15,585	-	21,468	-	32,015	-	45,898	-
	TOTAL RECREATION DAYS	21,648	-	28,598	-	41,417	-	58,627	-
	WATER-ORIENTED RECREATION DAYS	6,234	-	8,587	-	12,806	-	18,359	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface recreation days.

TABLE 21-77 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 5.2

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	9,650	8,392	14,046	12,150	21,875	18,914	31,320	27,093
	Beach (55%) *	5,307	4,616	7,726	6,683	12,031	10,403	17,226	14,901
	Picnicking	5,425	3,568	6,785	4,435	9,232	6,038	12,496	8,163
	Camping	1,081	671	1,709	1,053	2,800	1,713	4,327	2,661
	Nature Walking	1,310	352	1,641	436	2,191	583	2,967	782
	Hiking	562	393	867	533	1,353	830	1,976	1,209
	Sightseeing	6,423	2,618	8,624	3,489	12,828	5,201	18,565	7,539
	TOTAL ACTIVITY OCCASIONS	24,451	15,994	33,624	22,096	50,279	35,005	71,651	47,447
	TOTAL ACTIVITY OCCASIONS (55%)	20,108	12,218	27,304	16,629	40,435	26,494	57,557	35,255
	TOTAL RECREATION DAYS**	9,780	6,398	13,450	8,838	20,112	14,002	28,660	18,979
	TOTAL RECREATION DAYS (55%)	8,043	4,887	10,922	6,652	16,174	10,598	23,023	14,102
LAND-BASED OTHER	Playing Outdoor Games	20,262	6,835	29,737	10,030	49,344	16,653	72,928	24,635
	Golfing	1,804	903	2,629	1,314	4,478	2,239	6,534	3,266
	Bicycling	8,296	2,745	9,938	3,261	13,418	4,384	18,459	5,952
	Bicycling (25%) **	2,074	686	2,484	815	3,354	1,096	4,615	1,488
	Horseback Riding	1,128	333	1,406	425	2,033	620	2,933	884
	Horseback Riding (25%)	282	83	352	106	508	155	733	221
	TOTAL ACTIVITY OCCASIONS	31,490	10,816	43,710	15,030	69,273	23,896	100,854	35,037
	TOTAL ACTIVITY OCCASIONS (25%)	24,422	8,507	35,202	12,265	57,684	20,143	84,810	29,610
	TOTAL RECREATION DAYS	12,596	4,326	17,484	6,012	27,709	9,558	40,342	14,015
	TOTAL RECREATION DAYS (25%)	9,769	3,403	14,080	4,906	23,074	8,057	33,924	11,844
WATER SURFACE	Boating	2,939	2,012	4,355	2,952	6,824	4,637	10,224	6,941
	Water Skiing	511	406	897	704	1,614	1,260	2,652	2,085
	Canoeing	205	116	310	174	473	268	696	379
	Sailing	187	124	270	178	431	277	699	452
	TOTAL ACTIVITY OCCASIONS	3,842	2,658	5,832	4,008	9,342	6,442	14,271	9,187
	TOTAL RECREATION DAYS	1,537	1,063	2,333	1,603	3,737	2,577	5,708	3,675
WINTER SPORTS	Skiing	323	-	346	-	431	-	540	-
	Sledding	1,606	-	2,036	-	3,248	-	5,069	-
	Ice Skating	1,305	-	2,049	-	3,339	-	5,126	-
	TOTAL ACTIVITY OCCASIONS	3,234	-	4,431	-	7,018	-	10,635	-
	TOTAL RECREATION DAYS	1,294	-	1,772	-	2,807	-	4,254	-
OTHER ACTIVITIES	Driving for Pleasure	14,101	5,274	17,774	6,598	23,668	8,791	31,014	7,614
	Walking for Pleasure	11,249	2,642	13,839	3,239	19,460	4,548	27,135	6,342
	Attending Outdoor Games	3,977	1,744	5,131	2,235	7,149	3,118	9,778	4,213
	Attending Outdoor Concerts	597	435	845	605	1,325	962	1,929	1,396
	TOTAL ACTIVITY OCCASIONS	29,924	10,095	37,589	12,677	51,602	17,419	6,9856	19,565
	TOTAL RECREATION DAYS	11,970	4,038	15,036	5,071	20,640	6,968	27,942	7,826
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	92,941	-	125,186	-	187,514	-	267,267	-
	WATER-ORIENTED ACTIVITY OCCASIONS	23,950	-	33,138	-	49,960	-	71,828	-
	TOTAL RECREATION DAYS	37,177	-	50,075	-	75,006	-	106,907	-
	WATER-ORIENTED RECREATION DAYS	9,580	-	13,255	-	19,984	-	28,731	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface days.

TABLE 21–78 Recreation Requirements in Activity Occasions, Great Lakes Planning Subarea 5.3

Annual Activity Occasions (in thousands)

	Activity	1970 Annual	1970 Summer	1980 Annual	1980 Summer	2000 Annual	2000 Summer	2020 Annual	2020 Summer
LAND-BASED WATER ORIENTED	Swimming	2,100	1,826	3,024	2,616	4,636	4,008	6,528	5,648
	Beach (55%)*	1,155	1,004	1,663	1,439	2,550	2,204	3,590	3,106
	Picnicking	1,184	778	1,469	957	1,961	1,282	2,583	1,705
	Camping	236	148	371	228	506	365	905	556
	Nature Walking	287	76	355	93	466	123	621	163
	Hiking	120	73	188	115	287	176	413	252
	Sightseeing	1,399	572	1,860	756	2,723	1,103	4,497	1,439
	TOTAL ACTIVITY OCCASIONS	5,326	3,473	7,267	4,765	10,579	7,057	15,547	9,763
	TOTAL ACTIVITY OCCASIONS (55%)	4,381	2,651	5,906	3,588	8,493	5,253	12,609	7,221
	TOTAL RECREATION DAYS **	2,130	1,389	2,907	1,906	4,232	2,823	6,219	3,905
	TOTAL RECREATION DAYS (55%)	1,752	1,060	2,362	1,435	3,397	2,101	5,044	2,888
LAND-BASED OTHER	Playing Outdoor Games	4,414	1,490	6,410	2,163	10,799	3,536	15,231	5,146
	Golfing	394	197	568	284	951	476	1,366	683
	Bicycling	1,816	602	2,148	706	2,854	941	3,779	1,246
	Bicycling (25%)***	454	150	537	176	713	235	945	312
	Horseback Riding	247	75	305	91	422	133	613	185
	Horseback Riding (25%)	62	19	76	23	105	33	153	46
	TOTAL ACTIVITY OCCASIONS	6,871	2,334	9,431	3,244	15,026	5,086	20,989	7,260
	TOTAL ACTIVITY OCCASIONS (25%)	5,324	1,856	7,591	2,646	12,568	4,280	17,694	6,187
	TOTAL RECREATION DAYS	2,748	946	3,772	1,298	6,010	2,034	8,396	2,904
	TOTAL RECREATION DAYS (25%)	2,130	742	3,036	1,058	5,027	1,712	7,078	2,475
WATER SURFACE	Boating	643	440	942	638	1,452	986	2,138	1,451
	Water Skiing	111	89	195	153	345	268	554	436
	Canoeing	44	26	68	38	101	58	145	79
	Sailing	40	27	58	39	91	59	145	94
	TOTAL ACTIVITY OCCASIONS	838	582	1,263	868	1,989	1,371	2,982	2,060
	TOTAL RECREATION DAYS	335	233	505	347	796	548	1,193	824
WINTER SPORTS	Skiing	70	-	76	-	92	-	112	-
	Sledding	350	-	439	-	686	-	1,058	-
	Ice Skating	285	-	442	-	709	-	1,070	-
	TOTAL ACTIVITY OCCASIONS	705	-	957	-	1,487	-	2,240	-
	TOTAL RECREATION DAYS								
OTHER ACTIVITIES	Driving for Pleasure	3,076	1,152	3,836	1,425	5,025	1,866	6,475	2,409
	Walking for Pleasure	2,448	574	2,980	697	4,124	963	5,657	1,321
	Attending Outdoor Games	2,289	831	3,225	1,161	5,150	1,840	7,349	2,623
	Attending Outdoor Concerts	129	95	181	135	280	205	393	291
	TOTAL ACTIVITY OCCASIONS	7,942	2,652	10,222	3,418	14,579	4,874	19,874	6,644
	TOTAL RECREATION DAYS	3,177	1,061	4,089	1,367	5,832	1,950	7,950	2,658
	PLANNING AREA TOTALS:****								
	TOTAL ACTIVITY OCCASIONS	21,680	-	29,140	-	43,662	-	61,635	-
	WATER-ORIENTED ACTIVITY OCCASIONS	5,218	-	7,168	-	10,482	-	15,592	-
	TOTAL RECREATION DAYS	8,672	-	11,656	-	17,465	-	24,654	-
	WATER-ORIENTED RECREATION DAYS	2,087	-	2,867	-	4,193	-	6,237	-

*It is assumed that 45% of all swimming is associated with pools and 55% is associated with beaches. For planning purposes, activity occasions and recreation days for land-based water-oriented activities are presented in two manners, one including all swimming and the other including only beach-associated swimming.

**It is assumed that a recreation day consists of 2.5 activity occasions.

***For planning purposes, it is assumed that only 25% of all bicycling and horseback riding needs will be met on designated public recreation areas. The other 75% is assumed to occur on private lands or public sidewalks and streets.

****Total activity occasions and total recreation days include the sum of all activities. Total water-oriented recreation days are the sum of land-based water-oriented recreation days (55%) and water surface days.

TABLE 21-79 1970 Recreation Requirements in Acres or Miles*

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based																
Water-Oriented																
Swimming	60	20	200	780	370	100	40	150	390	210	270	200	110	180	40	3,120
Picnicking	900	350	2,890	4,570	2,130	1,530	580	840	2,280	1,240	1,580	1,190	640	1,100	600	22,420
Camping	350	140	1,180	2,910	1,350	620	240	530	1,450	780	1,000	820	400	580	230	12,580
Hiking	130	70	560	1,040	500	290	110	200	540	290	370	180	150	270	120	4,820
Nature Trails	10	10	30	110	50	10	10	20	50	30	40	20	20	20	10	440
Land-Based General																
Outdoor Games	1,500	870	7,280	14,500	6,510	2,180	1,470	2,660	7,230	3,820	5,000	2,360	1,140	3,170	1,550	61,240
Golf	2,160	720	6,000	23,600	11,000	3,160	1,200	4,320	11,780	6,420	8,160	3,840	3,300	5,020	1,240	91,920
Bicycling	140	70	580	2,320	1,080	310	120	420	1,160	620	800	380	320	480	120	8,920
Horseback Riding	60	20	140	560	260	80	30	100	280	150	190	90	80	120	30	2,190
Water Surface																
Boating	52	17	136	214	105	71	27	39	107	61	73	35	30	47	29	1,043
Sailing	2	2	8	13	0**	5	2	2	7	0	5	2	2	0	0	50
Canoeing																
Lakes	1	0	4	10	5	2	1	2	5	3	3	2	1	2	1	42
Streams	100	20	300	750	600	150	80	250	625	325	425	200	175	275	75	4,350
Water-Skiing	6	2	19	75	36	10	4	14	38	20	26	12	10	15	4	291
Winter Sports																
Skiing	110	70	520	2,080	970	280	110	380	1,040	560	720	340	290	450	110	8,030
Sledding	190	80	640	2,520	1,180	340	130	470	1,260	690	870	420	360	560	140	9,850
Ice Skating	10	10	50	190	90	30	10	40	100	60	70	30	30	40	10	770

*Hiking, nature trails, bicycling, horseback riding, and stream canoeing are stated in miles; all others are in acres except water surface which is in 1,000s of acres. The data for land include developed land only and do not include land for buffer between activities and land for low intensity of use.
**Water for sailing is included in boating waters.

TABLE 21-80 1980 Recreation Requirements in Acres or Miles*

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based																
Water-Oriented																
Swimming	70	30	280	1,140	540	150	60	210	580	320	390	280	160	260	60	4,530
Picnicking	1,080	400	3,570	5,720	2,710	1,910	730	1,060	2,910	1,580	1,950	1,440	790	1,230	750	27,830
Camping	530	210	1,850	4,600	2,160	990	380	850	2,340	1,250	1,560	1,250	620	910	360	19,860
Hiking	190	100	890	1,720	810	460	180	320	880	470	590	280	240	370	180	7,680
Nature Trails	10	10	40	130	60	20	10	30	70	30	50	20	20	30	10	540
Land-Based General																
Outdoor Games	2,150	1,320	10,600	21,400	9,740	3,130	2,180	3,960	10,900	5,690	7,320	3,420	1,620	4,650	2,250	90,330
Golf	3,000	1,100	8,700	34,660	16,300	4,240	1,760	6,420	17,660	8,380	11,820	5,520	4,780	7,300	1,780	133,420
Bicycling	160	80	700	2,770	1,300	370	140	520	1,420	760	940	450	380	570	140	10,700
Horseback Riding	70	20	180	690	330	90	40	130	360	180	240	110	100	150	40	2,730
Water Surface																
Boating	66	22	198	316	157	106	40	58	161	91	107	49	43	69	42	1,525
Sailing	3	1	12	19	0**	7	2	4	10	0	7	3	3	0	0	71
Canoeing																
Lakes	2	1	6	15	7	3	1	3	8	4	5	2	2	3	1	63
Streams	150	25	475	1,850	875	250	100	350	950	500	625	300	250	400	100	7,200
Water-Skiing	11	4	33	132	63	15	6	24	67	36	45	21	18	26	6	507
Winter Sports																
Skiing	120	60	550	2,240	1,050	300	120	420	1,140	610	760	360	310	480	120	8,640
Sledding	230	90	810	3,240	1,530	430	170	600	1,650	890	1,100	520	450	710	170	12,590
Ice Skating	20	10	80	310	150	40	20	60	160	80	110	50	40	70	20	1,220

*Hiking, nature trails, bicycling, horseback riding, and stream canoeing are stated in miles; all others are in acres except water surface which is in 1,000s of acres. The data for land include developed land only and do not include land for buffer between activities and land for low intensity of use.
**Water for sailing is included in boating waters.

TABLE 21-81 2000 Recreation Requirements in Acres or Miles*

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based																
Water-Oriented																
Swimming	110	40	450	1,780	850	240	90	330	930	500	600	430	250	400	100	7,100
Picnicking	1,360	490	4,920	7,830	3,760	2,640	1,000	1,460	4,060	2,150	2,640	1,920	1,080	1,680	1,000	37,990
Camping	820	300	3,040	7,520	3,600	1,630	620	1,410	3,600	2,040	2,510	1,980	1,000	1,490	570	32,130
Hiking	280	130	1,420	2,690	1,300	730	280	500	1,390	760	900	420	370	580	280	12,030
Nature Trails	10	10	60	180	90	20	10	30	90	60	60	30	30	40	10	730
Land-Based General																
Outdoor Games	3,400	1,760	18,180	36,300	17,250	4,990	3,710	6,800	18,800	9,870	12,260	5,620	2,540	7,710	3,680	152,870
Golf	4,850	1,480	15,000	59,400	28,500	8,020	3,040	10,060	30,500	15,340	20,000	9,160	8,100	12,440	2,980	228,870
Bicycling	200	90	950	3,780	1,820	510	200	710	1,960	1,050	1,270	590	510	760	190	14,590
Horseback Riding	90	30	260	1,020	500	140	50	190	530	280	340	160	140	220	50	4,000
Water Surface																
Boating	98	31	315	499	254	168	64	93	258	147	167	77	68	109	65	2,413
Sailing	4	2	19	30	0**	14	4	6	15	0	10	5	4	0	0	113
Canoeing																
Lakes	2	1	9	23	11	5	2	4	12	6	8	4	3	5	2	97
Streams	200	35	725	2,920	1,425	400	150	550	1,500	800	975	450	400	625	150	11,305
Water-Skiing	18	6	60	240	112	42	12	44	122	65	79	37	31	46	11	925
Winter Sports																
Skiing	140	70	700	2,800	1,350	380	150	530	1,460	790	940	430	380	600	150	10,870
Sledding	340	130	1,300	5,020	2,470	700	260	970	2,680	1,740	1,470	800	720	1,130	270	20,000
Ice Skating	30	10	130	500	240	70	30	90	260	150	170	70	70	110	30	1,960

*Hiking, nature trails, bicycling, horseback riding, and stream canoeing are stated in miles, all others are in acres except water surface which is in 1,000s of acres. The data for land include developed land only and do not include land for buffer between activities and land for low intensity of use.

**Water for sailing is included in boating waters.

TABLE 21-82 2020 Recreation Requirements in Acres or Miles*

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based																
Water-Oriented																
Swimming	150	60	650	2,540	1,240	350	130	480	1,350	730	860	600	350	570	140	10,200
Picnicking	1,680	610	6,790	10,630	5,270	3,650	1,370	2,020	5,630	3,050	3,590	2,560	1,450	2,270	1,330	51,900
Camping	1,150	430	4,800	11,720	5,750	2,580	970	2,220	6,200	3,290	3,930	3,000	1,550	2,310	870	50,770
Hiking	410	180	2,120	3,880	1,910	1,080	400	740	2,060	1,120	1,310	590	530	840	400	17,570
Nature Trails	10	10	80	240	120	100	20	50	130	70	80	40	30	50	10	1,040
Land-Based General																
Outdoor Games	4,700	2,420	28,460	56,100	25,600	7,610	5,560	10,240	28,530	14,950	18,230	8,110	4,100	11,400	5,350	231,360
Golf	6,600	2,020	23,160	86,740	42,660	11,990	4,480	16,340	44,680	23,560	29,340	13,100	11,760	18,160	4,280	338,870
Bicycling	250	110	1,300	5,100	2,500	700	270	970	2,550	1,450	1,720	770	680	1,040	250	19,660
Horseback Riding	150	40	380	1,470	720	200	80	280	780	420	490	220	200	310	70	5,810
Water Surface																
Boating	136	44	480	747	391	256	97	151	395	227	251	113	100	164	96	3,648
Sailing	5	2	32	49	0**	17	6	0	26	0	17	7	7	0	0	168
Canoeing																
Lakes	4	1	13	31	16	7	3	6	18	9	11	5	5	7	2	138
Streams	300	40	1,175	3,925	2,050	575	225	800	2,200	1,175	1,400	625	575	875	200	16,140
Water-Skiing	27	9	100	386	190	54	20	74	206	112	131	58	52	78	18	1,515
Winter Sports																
Skiing	140	80	900	3,500	1,760	480	180	670	1,870	1,010	1,180	530	480	750	180	13,710
Sledding	500	180	2,050	8,000	3,980	1,100	410	1,530	4,250	2,270	2,720	1,220	1,100	1,760	410	31,480
Ice Skating	40	20	200	770	380	210	40	150	410	230	260	120	110	160	40	3,140

*Hiking, nature trails, bicycling, horseback riding, and stream canoeing are stated in miles, all others are in acres except water surface which is in 1,000s of acres. The data for land include developed land only and do not include land for buffer between activities and land for low intensity of use.

**Water for sailing is included in boating waters.

TABLE 21–83 Amount, Ownership, and Recreational Potential of Great Lakes Beaches (in acres)

Planning Subarea	Publicly Owned Beaches Usable: Open To Public	Publicly Owned Beaches Usable: Restricted	Publicly Owned Beaches Usable: Not Usable	Privately Owned Beaches Open to Public: With Charge	Privately Owned Beaches Open to Public: Without Charge	Privately Owned Beaches Not Open to Public: Potential for Devlp.	Privately Owned Beaches Not Open to Public: Little or No Potential	Total
1.1	34.7	0	.1	7.3	0	0	8.5	50.6
1.2	127.3	.5	0	0	9.6	0	23.1	160.5
2.1	137.5	3.9	.8	0	0	64.2	223.6	430.0
2.2	570.2	72.4	53.9	26.8	0	202.6	116.6	1,042.5
2.3	215.5	0	0	0	0	426.6	198.9	841.0
2.4	293.1	0	0	0	0	497.3	121.0	911.4
3.1	83.4	0	0	0	23.5	46.6	357.8	511.3
3.2	43.6	0	13.1	0	0	0	157.2	213.9
4.1	142.7	0	13.6	6.8	7.7	111.9	146.0	428.7
4.2	22.8	0	0	54.7	3.6	77.9	64.7	223.7
4.3	162.6	8.2	15.0	.7	4.8	8.9	46.9	247.1
4.4	216.1	21.6	12.2	21.1	40.7	42.6	63.7	418.0
5.1	2.5	0	6.9	0	0	0	24.9	34.3
5.2	11.5	0	0	3.9	1.7	0	0	17.1
5.3	11.9	0	0	0	0	0	0	11.9
Total	2,075.4	106.6	115.6	121.3	91.6	1,478.6	1,552.9	5,542.0
Percent	37.4	1.9	2.1	2.2	1.7	26.7	28.0	100.0

TABLE 21–84 Distribution of BOR Classified Recreation Lands by Planning Subarea*

Planning Subarea	I	II	III	IV	V	VI
1.1	1,146	8,356	3,804,784	2,100	908,731	1,095
1.2	144	5,957	4,635,836	19,492	317,676	1,020
2.1	1,778	5,179	1,577,293	10,598	-------	82
2.2	19,720	46,332	51,021	8,250	-------	135
2.3	5,029	23,887	53,889	960	-------	22
2.4	335	10,958	1,607,841	3,111	3,397	598
3.1	110	10,081	1,680,434	80	-------	25
3.2	1,517	5,808	3,921	-----	-------	10
4.1	10,179	28,243	28,243	28	-------	8
4.2	2,820	6,333	20,810	-----	-------	223
4.3	556	1,094	6,486	-----	-------	10
4.4	1,178	1,992	1,305	548	700	101
5.1	2,849	11,796	11,000	1,652	3,155	1,025
5.2	1,118	13,147	4,155	4	-------	323
5.3	-----	50,785	-----	-----	-------	---
Totals	48,499	229,948	13,487,118	46,823	1,233,659	4,677

*Based on 1964 BOR inventory data.

TABLE 21–85 1970 Supply in Recreation Days by Planning Subarea by Activity (in thousands)

Activity	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Totals
Swimming*	2,438	636	1,802	5,485	3,815	1,802	636	596	3,100	1,073	2,385	2,385	477	954	106	27,690
Picnicking	736	464	1,896	9,568	2,134	1,200	616	764	2,605	1,954	2,021	2,673	1,033	3,144	712	31,520
Camping	531	328	477	560	880	540	415	321	283	358	925	612	664	970	540	8,404
Hiking & Nature Trails	300	106	59	500	240	25	38	60	220	240	100	80	80	20	---	2,068
Outdoor Games	931	54	1,202	28,257	6,943	76	11	1,632	9,598	9,086	9,744	1,242	731	1,754	87	71,348
Golf	211	19	602	1,742	662	24	77	66	317	1,503	2,678	346	144	605	73	9,069
Bicycling	46	31	154	104	35	123	31	69	225	---	---	---	---	---	---	818
Horseback Riding	261	---	26	147	39	70	113	20	49	29	78	---	20	10	---	862
Boating**	8,726	6,269	5,208	4,613	4,183	7,130	3,035	3,848	4,565	2,032	2,008	2,318	1,147	5,282	1,145	61,509
Skiing	259	18	120	49	14	51	5	12	66	---	17	3	6	---	---	620
Sledding	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ice Skating	334	---	111	9,521	251	222	---	---	626	2,130	1,253	251	376	---	---	15,075
Total***	14,773	7,925	11,657	60,546	19,196	11,263	4,977	7,388	21,654	18,405	21,209	9,910	4,678	12,739	2,663	228,983

*Beaches only
**Includes canoeing, water skiing, and sailing
***Each planning subarea's total recreation supply cannot be directly compared to its total requirement, for the requirement data also includes sightseeing, driving for pleasure, walking for pleasure, and pool swimming.

TABLE 21–86 1980 Supply in Recreation Days by Planning Subarea by Activity (in thousands)

Activity	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Swimming*	2,755	636	3,921	6,080	3,815	1,802	636	596	3,100	1,073	2,385	2,385	477	954	106	30,721
Picnicking	928	464	2,360	10,915	2,134	1,200	616	764	2,605	1,954	2,021	2,673	1,033	3,144	712	33,523
Camping	652	407	672	701	880	540	490	418	283	358	925	612	664	970	540	9,112
Hiking & Nature Trails	325	106	190	560	240	25	38	60	220	240	100	80	80	20	---	2,284
Outdoor Games	964	54	1,300	28,501	6,943	76	11	1,632	9,598	9,086	9,744	1,242	731	1,754	87	71,723
Golf	228	19	794	2,002	662	24	77	66	317	1,817	2,678	346	144	605	73	9,852
Bicycling	46	31	184	121	35	123	31	69	225	---	---	---	---	---	---	865
Horseback Riding	278	---	70	206	39	70	113	20	49	29	78	---	20	10	---	982
Boating**	8,726	6,269	5,208	4,613	4,183	7,130	3,035	3,848	4,565	2,032	2,008	2,318	1,147	5,282	1,145	61,509
Skiing	279	18	143	58	14	51	5	12	66	---	17	3	6	---	---	672
Sledding	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ice-Skating	334	---	111	9,521	251	222	---	---	626	2,130	1,253	251	376	---	---	15,075
Totals***	15,515	8,004	14,953	63,278	19,196	11,263	5,052	7,485	21,654	18,719	21,209	9,910	4,678	12,739	2,663	236,318

*Beaches only
**Includes canoeing, water skiing, and sailing
***Each planning subarea's total recreation supply cannot be directly compared to its total requirement, for the requirement data also includes sightseeing, driving for pleasure, walking for pleasure, and pool swimming.

TABLE 21–87 1970 Summary of Needs in Acres or Miles***

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2
Land-Based Water Oriented								
Swimming	-180**	-36	30	320	50	-70	-20	100
Picnicking	-20	-230	520	310	1,180	30	-190	500
Camping	-930	-650	30	2,160	170	680	-760	100
Hiking & Nature Trails***	-570	-170	450	900	430	240	30	190
Land-Based Other								
Outdoor Games	640	820	6,170	2,900	3,660	2,110	1,460	1,990
Golf	510	570	1,300	11,500	6,400	2,940	600	3,860
Bicycling***	110	50	480	2,260	1,060	230	100	380
Horseback Riding***	-240	20	110	410	220	0	-100	80
Water Surface								
Boating--including sail, canoe, skiing	-770,000	-576,000	-329,000	119,000	-29,000	-591,000	-255,000	-104,000
Winter Sports								
Skiing	-900	0	50	1,910	920	80	90	340
Sledding	190	80	640	2,520	1,180	340	130	470
Ice Skating	-20	10	40	-570	70	20	10	40

Activity	Planning Subarea 4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based Water-Oriented								
Swimming	130	120	70	0	70	100	30	714
Picnicking	1,120	370	680	0	180	-400	-290	3,760
Camping	1,070	300	-240**	0	-490	-720	-1,070	-1,710
Hiking & Nature Trails***	480	200	360	160	130	280	130	3,240
Land-Based Other								
Outdoor Games	3,290	90	1,000	1,850	840	2,450	1,470	30,740
Golf	9,580	-4,020	-10,440	1,440	2,300	820	670	28,030
Bicycling***	1,030	620	800	380	320	480	120	8,420
Horseback Riding***	230	120	110	90	60	110	30	1,250
Water Surface								
Boating--including sail, canoe, skiing	-34,000	-1,000	23,000	-46,000	-5,000	-156,000	-75,000	-2,829,000
Winter Sports								
Skiing	810	560	660	330	270	450	110	5,680
Sledding	1,260	690	870	420	360	560	140	9,850
Ice Skating	50	-110	-30	10	0	40	10	-430

*The data include developed land only and do not include land for buffer between activities and land for low intensity of use.
**A negative number indicates a surplus.
***Given in miles. All others are in acres.

TABLE 21–88 1980 Summary of Needs in Acres or Miles***

	Planning Subarea							
Activity	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2
Land-Based Water Oriented								
Swimming	-190**	-30	-90	630	220	-20	0	160
Picnicking	-80	-180	620	860	1,760	410	-40	720
Camping	-1,040	-770	230	3,660	970	-320	-800	290
Hiking & Nature Trails***	-570	-140	480	1,570	750	420	100	320
Land-Based Other								
Outdoor Games	1,260	1,270	9,400	9,700	6,890	3,060	2,170	3,290
Golf	1,220	950	2,500	20,760	11,700	4,050	1,160	5,960
Bicycling***	130	60	580	2,700	1,280	290	120	480
Horseback Riding***	-250	20	100	480	290	10	-90	110
Water Surface								
Boating--including sail, canoe, skiing	-749,000	-569,000	-247,000	289,000	52,000	-548,000	-240,000	-72,000
Winter Sports								
Skiing	-970	-10	-10	2,040	1,000	100	100	380
Sledding	230	90	810	3,240	1,530	430	170	600
Ice Skating	-13	10	70	-450	130	30	20	60

	Planning Subarea							
Activity	4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based Water-Oriented								
Swimming	320	230	190	80	120	180	50	1,850
Picnicking	1,750	710	1,050	250	330	-170**	-140	7,850
Camping	1,960	770	320	430	-270	-390	-940	4,100
Hiking & Nature Trails***	840	380	590	260	220	390	190	5,800
Land-Based Other								
Outdoor Games	6,960	1,960	3,320	2,910	1,320	3,930	2,170	59,610
Golf	15,460	-4,240	-6,780	3,120	3,780	3,100	1,210	63,950
Bicycling***	1,290	760	940	450	380	570	140	10,170
Horseback Riding***	310	150	160	110	80	140	40	1,660
Water Surface								
Boating--including sail, canoe, skiing	55,000	46,000	80,000	-22,000	18,000	-119,000	-60,000	-2,086,000
Winter Sports								
Skiing	910	610	700	350	290	480	120	6,090
Sledding	1,650	890	1,100	520	450	710	170	12,590
Ice Skating	110	-90	10	30	10	70	20	20

*The data include developed land only and do not include land for buffer between activities and land for low intensity of use.
**A negative number indicates a surplus.
***Given in miles. All others are in acres.

TABLE 21–89 2000 Summary of Needs in Acres or Miles***

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2
Land-Based Water-Oriented								
Swimming	-150**	-20	80	1,270	530	70	30	280
Picnicking	200	-90	1,970	2,970	2,810	1,140	230	1,120
Camping	-750	-680	1,420	6,580	2,410	330	-560	850
Hiking & Nature Trails***	-480	-110	1,020	2,590	1,270	690	200	500
Land-Based Other								
Outdoor Games	2,510	1,710	16,980	24,600	14,400	4,920	3,700	6,130
Golf	3,070	1,330	8,800	45,500	23,900	7,830	2,440	9,600
Bicycling***	170	70	730	3,710	1,800	430	180	670
Horseback Riding***	-230	30	180	810	460	60	-80	170
Water Surface								
Boating--including sail, canoe, skiing	-709,000	-557,000	-93,000	599,000	202,000	-450,000	-207,000	-14,000
Winter Sports								
Skiing	-950	0	140	2,600	1,300	180	130	490
Sledding	340	130	1,300	5,020	2,470	700	260	970
Ice Skating	-4	10	120	-260	220	40	30	90

Activity	Planning Subarea 4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based Water-Oriented								
Swimming	670	410	400	230	210	320	90	4,420
Picnicking	2,900	1,280	1,740	730	620	280	110	18,010
Camping	3,220	1,560	1,270	1,160	110	190	-730	16,380
Hiking & Nature Trails***	1,370	700	910	410	360	610	290	10,330
Land-Based Other								
Outdoor Games	14,860	6,140	8,260	5,110	2,240	6,990	3,600	122,150
Golf	28,300	2,720	1,400	6,760	7,100	8,240	2,410	159,400
Bicycling***	1,830	1,050	1,270	590	510	760	190	14,060
Horseback Riding***	480	250	260	160	120	210	50	2,930
Water Surface								
Boating--including sail, canoe, skiing	216,000	133,000	180,000	26,000	58,000	-61,000**	-31,000	-708,000
Winter Sports								
Skiing	1,230	790	880	420	360	600	150	8,320
Sledding	2,680	1,470	1,740	800	720	1,130	270	20,000
Ice Skating	210	-20	70	50	40	110	30	736

*The data include developed land only and do not include land for buffer between activities and land for low intensity of use.
**A negative number indicates a surplus.
***Given in miles. All others are in acres.

TABLE 21-90 2020 Summary of Needs in Acres or Miles***

Activity	Planning Subarea 1.1	1.2	2.1	2.2	2. 3	2.4	3.1	3.2
Land-Based Water Oriented								
Swimming	-90**	0	280	2,030	920	180	70	430
Picnicking	520	30	3,840	5,770	4,320	2,150	600	1,680
Camping	-420	-550	3,180	10,780	4,560	1,280	-210	1,660
Hiking & Nature Trails***	-330	-60	1,730	3,840	1,910	1,120	330	760
Land-Based Other								
Outdoor Games	3,810	2,370	27,260	44,400	22,750	7,540	5,550	9,570
Golf	4,820	1,870	16,960	72,840	38,060	11,800	3,880	15,880
Bicycling***	220	90	1,180	5,030	2,480	620	250	930
Horseback Riding***	-170	40	300	1,260	680	120	-50	260
Water Surface								
Boating--including sail, canoe, skiing	-659,000	-541,000	129,000	1,020,000	418,000	-345,000	163,000	70,000
Winter Sports								
Skiing	-950	10	340	3,300	1,710	280	160	630
Sledding	500	180	2,050	8,000	3,980	1,100	410	1,530
Ice Skating	7	20	190	10	360	190	40	150

Activity	Planning Subarea 4.1	4.2	4.3	4.4	5.1	5.2	5.3	Total
Land-Based Water-Oriented								
Swimming	1,090	640	660	400	310	490	130	7,540
Picnicking	4,470	2,180	2,690	1,370	990	870	440	31,870
Camping	5,820	2,810	2,690	2,180	660	1,010	-430**	35,020
Hiking & Nature Trails***	2,080	1,070	1,340	590	520	880	410	16,190
Land-Based Other								
Outdoor Games	24,590	11,220	14,230	7,600	3,800	10,680	5,270	200,640
Golf	42,480	10,940	10,740	10,700	10,760	13,960	3,710	269,400
Bicycling***	2,420	1,450	1,720	770	680	1,040	250	19,130
Horseback Riding***	730	390	410	220	180	300	70	4,740
Water Surface								
Boating--including sail, canoe, skiing	454,000	263,000	326,000	86,000	116,000	28,000	7,000	1,207,000
Winter Sports								
Skiing	1,640	1,010	1,120	520	460	750	180	11,160
Sledding	4,250	2,270	2,720	1,220	1,110	1,760	410	31,490
Ice Skating	360	60	160	100	80	160	40	1,927

*The data include developed land only and do not include land for buffer between activities and land for low intensity of use.

**A negative number indicates a surplus.

***Given in miles. All others are in acres.

TABLE 21–91 Acre Needs for Land and Water by Recreation Land Class in 1970 (in thousands)

Planning Subarea	Total	Land Class I	Land Class II	Water Total
1.1	2.3	1.2	1.1	-----*
1.2	2.1	1.4	0.7	-----
2.1	14.5	8.2	6.3	-----
2.2	63.0	18.1	44.9	119.0
2.3	32.6	11.3	21.3	-----
2.4	7.7	5.4	2.3	-----
3.1	3.4	2.2	1.2	-----
3.2	19.2	6.7	12.5	-----
4.1	36.3	16.0	20.3	-----
4.2	12.5	0.3	12.2	-----
4.3	11.2	2.1	9.1	23.0
4.4	9.9	3.8	6.1	-----
5.1	7.9	3.6	4.3	-----
5.2	16.1	4.1	12.0	-----
5.3	5.4	2.3	3.1	-----
Total	244.1	86.7	157.4	142.0

*These planning subareas have a surplus of water surface.

TABLE 21–92 Acre Needs for Land and Water by Recreation Land Class in 1980 (in thousands)

Planning Subarea	Total	Land Class I	Land Class II	Water Total
1.1	4.8	2.7	2.1	-----*
1.2	3.3	2.2	1.1	-----
2.1	22.2	12.9	9.3	-----
2.2	116.3	39.0	77.3	289.0
2.3	64.4	20.6	43.8	52.0
2.4	11.6	7.7	3.9	-----
3.1	5.3	3.6	1.7	-----
3.2	28.7	10.7	18.0	-----
4.1	61.5	28.4	33.1	55.0
4.2	28.5	2.6	25.9	46.0
4.3	23.4	6.0	17.4	80.0
4.4	19.6	7.1	12.5	-----
5.1	13.2	6.0	7.2	18.0
5.2	26.2	8.4	17.8	-----
5.3	8.1	3.7	4.4	-----
Total	437.1	161.6	275.5	540.0

*These planning subareas have a surplus of water surface.

TABLE 21–93 Acre Needs for Land and Water by Recreation Land Class in 2000 (in thousands)

Planning Subarea	Total	Land Class I	Land Class II	Water Total
1.1	11.1	6.2	4.9	-----*
1.2	4.4	3.0	1.4	-----
2.1	48.1	27.8	20.3	-----
2.2	239.1	90.0	149.1	599.0
2.3	132.9	42.6	90.3	202.0
2.4	22.0	13.8	8.2	-----
3.1	9.9	6.6	3.3	-----
3.2	51.0	18.3	32.7	-----
4.1	120.6	64.8	55.8	216.0
4.2	63.3	10.6	52.7	133.0
4.3	58.1	15.3	42.8	180.0
4.4	42.4	14.1	28.3	26.0
5.1	24.6	10.9	13.7	58.0
5.2	50.6	17.9	32.7	-----
5.3	14.8	7.5	7.3	-----
Total	892.9	349.4	543.5	1,414.0

*These planning subareas have a surplus of water surface.

TABLE 21–94 Acre Needs for Land and Water by Recreation Land Class in 2020 (in thousands)

Planning Subarea	Total	Land Class I	Land Class II	Water Total
1.1	16.3	9.4	6.9	-------*
1.2	6.3	4.2	2.1	-------
2.1	83.4	47.6	35.8	129.0
2.2	397.3	152.0	245.3	1,020.0
2.3	219.5	69.5	150.0	418.0
2.4	34.9	21.0	13.9	-------
3.1	15.6	10.2	5.4	-------
3.2	84.0	29.4	54.6	70.0
4.1	194.4	85.8	108.6	454.0
4.2	114.1	24.9	89.2	263.0
4.3	111.1	34.4	76.7	326.0
4.4	72.2	22.5	49.7	86.0
5.1	42.5	17.1	25.4	116.0
5.2	84.2	28.9	55.3	28.0
5.3	25.3	9.8	15.5	7.0
Total	1,501.1	566.7	934.4	2,917.0

*These planning subareas have a surplus of water surface.

TABLE 21-95 Summary of Water-Oriented Recreation Needs—Satisfied and Unsatisfied* (Recreation Days in thousands)

Planning Subarea	1970 Requirements**	1970 Supply	1970 Needs** ***	1980 Requirements**	1980 Supply	1980 Needs**	1980 Program** Elements	1980 Residual Needs***
1.1	2,273	5,594	-3,321	2,951	6,547	-3,596	2,870	-6,466
1.2	979	2,156	-1,177	1,245	2,276	-1,031	4,982	-2,013
2.1	8,302	6,306	1,996	11,227	8,763	2,464	2,260	204
2.2	36,180	15,600	20,580	42,680	17,820	24,860	7,370	17,490
2.3	18,082	10,360	7,722	24,643	10,360	14,284	6,000	8,284
2.4	4,372	5,348	-976	5,994	5,348	646	1,950	-1,304
3.1	1,666	2,517	-851	2,287	2,630	-343	720	-1,063
3.2	6,752	2,535	4,217	9,330	2,682	6,648	3,230	3,418
4.1	18,398	9,033	9,365	25,640	9,033	16,607	7,680	8,927
4.2	10,052	5,070	4,982	13,850	5,070	8,780	5,455	3,325
4.3	12,730	8,045	4,685	17,220	8,045	9,175	5,690	3,485
4.4	9,776	8,596	1,180	12,939	8,596	4,343	4,820	-477
5.1	5,204	3,292	1,912	7,032	3,292	3,740	3,840	-100
5.2	9,766	7,386	2,380	13,450	7,386	6,064	5,350	714
5.3	1,752	2,051	-299	2,362	2,051	311	1,924	-1,613
Total	146,284	93,889	52,395	192,850	99,899	92,952	60,141	32,811

Planning Subarea	2000 Requirements**	2000 Supply	2000 Needs**	2000 Program Elements**	Residual Needs***	2020 Requirements**	2020 Supply	2020 Needs**	2020 Program Elements**	2020 Residual Needs***
1.1	4,040	6,547	-2,507	7,480	-9,987	5,372	6,547	-1,175	10,880	12,055
1.2	1,638	2,276	-638	2,946	-3,584	2,167	2,276	-109	4,910	-5,019
2.1	16,740	8,763	7,977	6,460	1,517	24,275	8,763	15,512	11,660	3,852
2.2	54,750	17,820	36,930	14,450	22,480	79,590	17,820	61,770	16,320	45,450
2.3	38,090	10,360	27,730	14,400	13,330	56,514	10,360	46,154	23,400	22,754
2.4	8,994	5,348	3,646	4,310	-664	13,038	5,348	7,690	7,140	550
3.1	3,404	2,630	774	2,430	-1,656	4,907	2,630	2,277	4,960	-2,683
3.2	14,400	2,682	11,718	7,310	4,408	20,284	2,682	17,602	12,020	5,582
4.1	38,830	9,033	29,797	16,210	13,587	56,564	9,033	47,531	25,280	22,251
4.2	21,010	5,070	15,940	10,570	5,370	30,650	5,070	25,580	17,030	8,550
4.3	25,260	8,045	17,215	11,750	5,465	36,110	8,045	28,065	15,180	12,885
4.4	18,725	8,596	10,129	10,040	89	26,156	8,596	17,560	16,540	1,020
5.1	10,331	3,292	7,039	8,320	-1,281	14,601	3,292	11,309	11,950	-641
5.2	20,184	7,386	12,798	9,990	2,808	28,660	7,386	21,274	14,760	6,514
5.3	3,397	2,051	1,346	3,348	-2,002	5,044	2,051	2,993	5,394	-2,401
Total	279,763	99,899	179,894	130,014	49,880	403,932	99,899	304,033	197,424	106,609

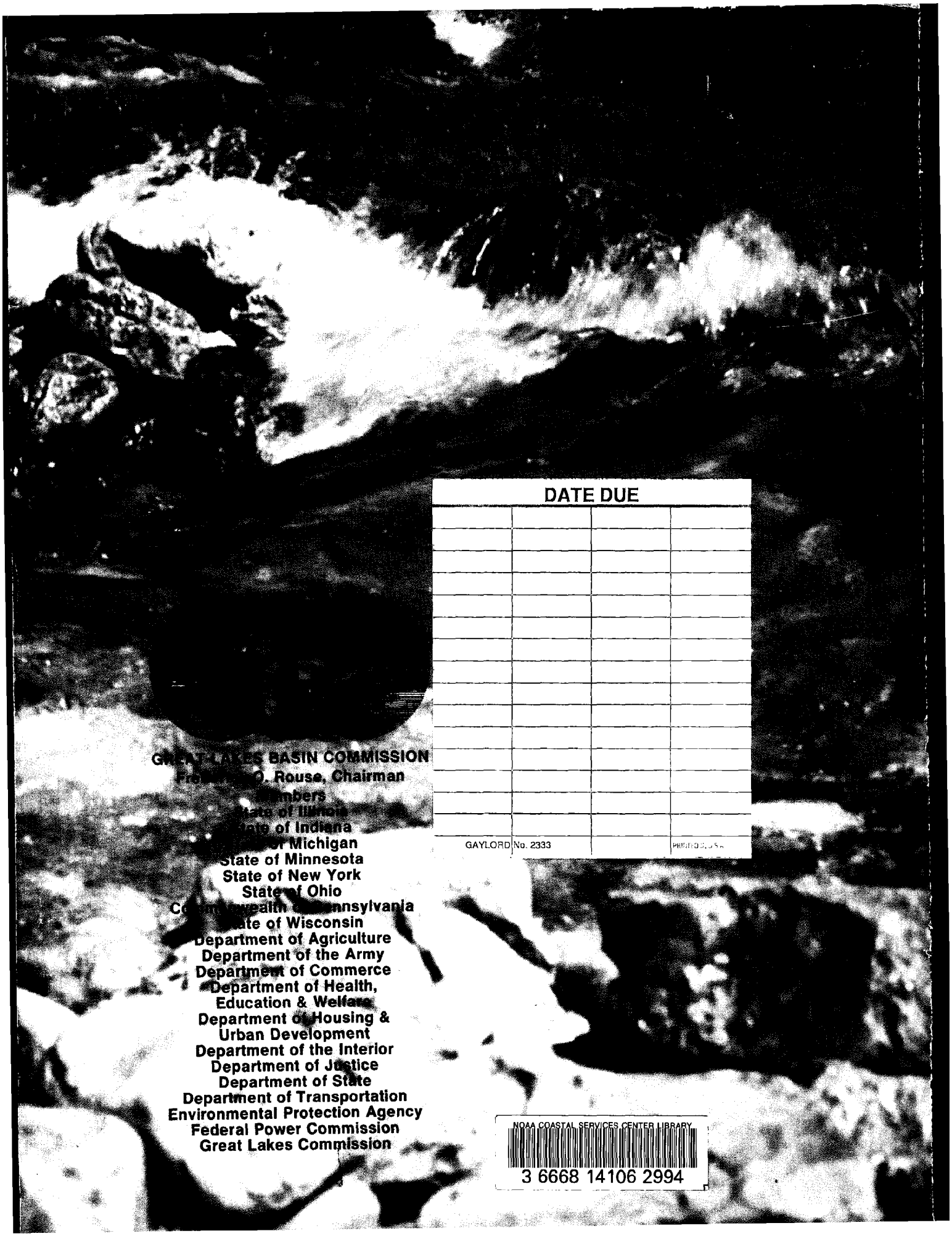
*Based on needs for swimming, picnicking, camping, hiking, sightseeing, and nature walks only.
**Figures are accumulative.
***(-) indicates a surplus.

TABLE 21–96 Land, Facility, and Contingency Cost Data by Planning Subarea and by State (in thousands of dollars)

Planning Subarea	State	1980 Land	1980 Facility & Contingency	1980 Total	2000 Land	2000 Facility & Contingency	2000 Total	2020 Land	2020 Facility & Contingency	2020 Total
1.1	Minnesota	25,994	5,069	31,063	100	8,000	8,100	0	8,000	8,000
	Wisconsin	5,120	6,435	11,555	720	7,744	8,464	0	2,000	2,000
	Total	31,114	11,504	42,618	820	15,744	16,564	0	10,000	10,000
1.2	Michigan	7,769	2,728	10,497	1,792	5,456	7,248	1,792	5,456	7,248
2.1	Wisconsin	8,935	11,731	20,666	7,958	23,177	31,135	25,026	34,149	59,175
	Michigan	0	322	322	0	483	483	0	483	483
	Total	8,935	12,053	20,988	7,958	23,650	31,618	25,026	34,632	59,658
2.2	Wisconsin	13,600	17,826	31,426	5,483	15,346	20,829	2,363	6,526	8,889
	Illinois	9,275	4,386	13,661	53,840	14,797	68,637	0	0	0
	Indiana	29,718	15,759	45,477	4,920	19,792	24,712	4,708	5,736	10,444
	Total	52,593	37,971	90,564	64,243	49,935	114,178	7,071	12,262	19,333
2.3	Indiana	6,240	9,643	15,883	6,240	9,643	15,883	6,240	9,643	15,883
	Michigan	27,740	26,969	54,709	37,980	41,382	79,362	41,460	46,151	87,611
	Total	33,980	36,612	70,592	44,220	51,025	95,245	47,700	55,794	103,494
2.4	Michigan	28,918	11,817	40,735	16,468	18,671	35,139	20,236	25,521	45,757
3.1	Michigan	5,590	2,217	7,807	12,668	6,205	18,873	10,918	13,059	23,977
3.2	Michigan	11,440	20,747	32,187	11,440	26,840	38,280	12,400	30,252	42,652
4.1	Michigan	94,660	49,889	144,549	101,600	55,774	157,374	84,000	49,679	133,679
4.2	Indiana	800	2,437	3,237	1,600	4,874	6,474	2,240	6,066	8,306
	Ohio	10,244	18,083	28,327	12,840	29,070	41,910	16,320	32,300	48,620
	Total	11,044	20,520	31,564	14,440	33,944	48,384	18,560	38,366	56,926
4.3	Ohio	63,940	36,591	100,531	66,000	42,663	108,663	32,540	26,723	59,263
4.4	Pennsylvania	1,200	1,193	2,393	1,800	1,788	3,588	3,600	3,577	7,177
	New York	16,880	15,618	32,498	36,925	46,029	82,954	33,975	41,632	75,607
	Total	18,080	16,811	34,891	38,725	47,817	86,542	37,575	45,209	82,784
5.1	New York	6,115	25,650	31,765	7,625	34,133	41,758	4,450	19,264	23,714
5.2	New York	7,400	30,108	37,508	8,200	30,133	38,333	7,800	28,929	36,729
5.3	New York	3,060	16,320	19,380	1,200	9,210	10,410	2,100	18,110	20,210
TOTAL		384,638	331,538	716,176	397,399	451,210	848,609	312,168	413,257	725,425

TABLE 21-97 Operation, Maintenance and Replacement Costs by Planning Subarea and State (in thousands of dollars)

Planning Subarea	State	Cumulative from 1970 to 1980	Cumulative from 1980 to 2000	Cumulative from 1970 to 2000	Cumulative from 2000 to 2020	Cumulative from 1970 to 2020
1.1	Minnesota	3,065	21,990	25,055	41,450	66,505
	Wisconsin	2,825	19,420	22,245	30,320	52,565
	Total	5,890	41,410	47,300	71,770	119,070
1.2	Michigan	1,775	14,200	15,975	28,400	44,375
2.1	Wisconsin	4,890	38,450	43,340	83,140	126,480
	Michigan	365	2,530	2,895	4,670	7,565
	Total	5,255	40,980	46,235	87,810	134,045
2.2	Wisconsin	6,830	54,320	61,150	87,060	148,210
	Illinois	2,375	21,420	23,795	33,340	57,135
	Indiana	7,620	45,560	53,180	64,940	118,120
	Total	16,825	121,300	138,125	185,340	323,465
2.3	Michigan	10,990	77,730	88,720	149,330	238,050
	Indiana	3,870	23,220	27,090	38,700	65,790
	Total	14,860	100,950	115,810	118,030	303,840
2.4	Michigan	4,810	32,630	37,440	67,630	105,070
3.1	Michigan	1,350	12,170	13,520	30,500	44,020
3.2	Michigan	8,190	53,710	61,900	98,560	160,460
4.1	Michigan	19,570	161,050	180,620	286,360	466,980
4.2	Ohio	9,780	62,870	72,650	113,410	186,060
	Indiana	910	7,290	8,200	15,600	23,800
	Total	10,690	70,160	80,850	129,010	209,860
4.3	Ohio	14,440	90,020	104,460	141,570	246,030
4.4	New York	8,595	74,490	83,085	148,210	231,295
	Pennsylvania	495	3,720	4,215	8,590	12,805
	Total	9,090	78,210	87,300	156,800	244,100
5.1	New York	12,615	76,250	88,865	118,830	207,695
5.2	New York	12,660	76,800	89,460	126,460	215,920
5.3	New York	5,665	29,900	35,565	49,490	85,055
TOTAL		143,685	999,740	1,143,425	1,766,560	2,909,985



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